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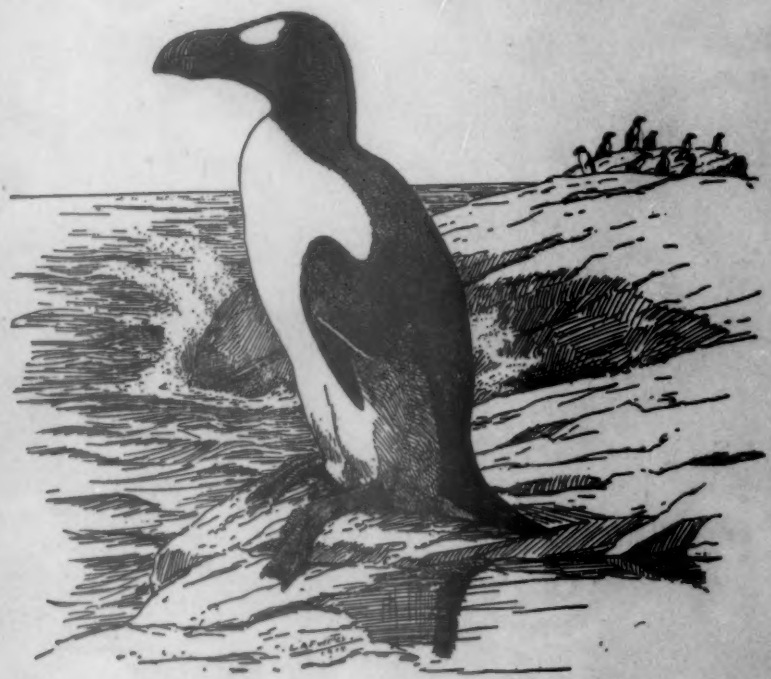

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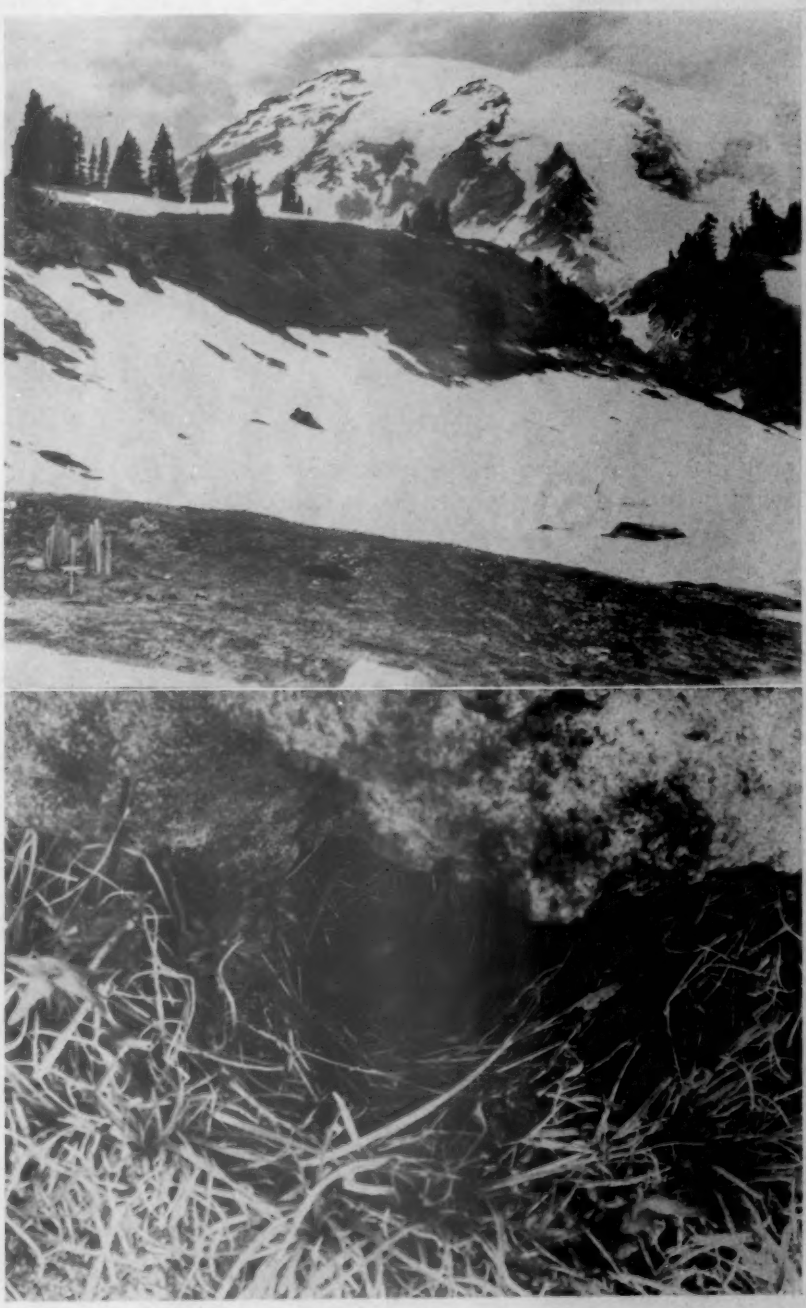

AMERICAN PIPIT (*Upper*) EDITH CREEK AMPHITHEATER ON MT. RANIER, WASHINGTON. NEST IS IN FRONT OF BLIND ON LOWER LEFT. (*Lower*) PIPIT NEST UNDER MARGIN OF BOULDER IN THE EDITH CREEK CIRQUE.

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THE AMERICAN PIPIT IN ITS ARCTIC-ALPINE HOME

BY GAYLE PICKWELL

Plates 1–4

IN the lowlands of California the American Pipit (*Anthus spinoletta rubescens*) is commonly observed as a wintering bird. Its mild *peep-eep* can be heard very frequently, even over cities. Its tail-bobbing, walking gait can be seen on nearly all plowed or vegetation-barren fields and around all borders of water and the margin of the sea. This wagtail is a common wintering bird. It does not leave its winter home until the last of April, but by that time it will have departed completely, and no more "peeping" and tail-wagging birds can be observed until September again returns.

That this bird nests in arctic conditions has been well known. Since true arctics were entirely too far to the north for me to visit, however, the Arctic-Alpine Zone of a high northwestern mountain was substituted. Pipits beginning their nesting activities and hunting nest sites, and battles between males were observed on July 5 on an "island" in Edith Creek amphitheater of Mt. Rainier, at an elevation of 6,000 feet in a region of extensive snows. A great deal was learned about the nesting activities of the species, but there still remains this problem: What did the pipits do between the last of April and the first week of July, a period of more than two months? Why was so extensive a time required to reach the breeding site?

The "island" mentioned was merely a shallow protrusion through the extensive snow fields. On the date mentioned a female pipit was flipping about this "island," showing the activities that accompany nest-site selection. At the same time, in her vicinity, two males were battling violently. One of the males was on the near-by snow. The other male plunged down from above with a determination rarely to be observed in any avian battles. This battle between the male

pipits was unlike any such struggle I have observed in extensive studies of the horned larks. These pipits fought on the ground as well as in the air. One stayed largely on the snow while the other dashed upon him from above and there was no denying the seriousness of their struggles. I had never seen larks fight so desperately or so lengthily. That these were territory struggles and that nesting was just beginning was later learned.

Pipits were heard to sing this day in a wonderful exhibition, surpassing horned larks. They sang in a setting that for magnificence and grandeur has no superior. Pipits were noted at two places in Edith Creek amphitheater and also upon Timber-line Ridge at an elevation of 6,400 feet. Extensive observations showed no nests.

Fogs kept the observers in their tent on July 6, but on July 7 extensive areas of the amphitheater and surrounding elevations were closely observed and only one singing bird was discovered. This was near Panorama Point at an elevation of 6,500 feet. This singing pipit was chased about for a long period, and sang frequently as he was driven from one point to the other. This chase involved steep slopes, deep snow, and rock slides that would try the best climber and beside which the staking of a lark's territory is child's play. The total territory of this pipit was amazingly large—several hundred yards in diameter. This territory was, of course, largely snow but included rock piles and slides and some small meadows of heather and grass. The blossoms that had appeared at this time were yellow and white avalanche lilies, potentilla, and western anemone. No nest, however, was discovered.

A second singing male was observed on the switchback of the trail that led from the amphitheater to Timber-line Ridge, and though this male presented a territory even larger than that of the first male, again no nest was noted. At the end of the day, on the return to camp, a moment was taken to observe the little "island" on which the female and the battling males had been seen on July 5. Almost inadvertently the margin beneath the edge of a small boulder on this island was examined and here was a nest, entirely new.

On July 8, the nest was again visited. The pipit was on the nest, flushed when disturbed, and bounced about, calling, with many evidences of solicitude. In the nest there was one egg. The male, however, was not noted. On this date a pair of pipits was noted to the northward of the Edith Creek amphitheater and also one bird singing on a meadow along Nisqually Glacier. The total number of pipit males certainly noted in the vicinity was now five, extending

from Nisqually Glacier to Panorama Point, from Panorama Point to Paradise Glacier, south to Sluiskin Falls, and west to Paradise Camp.

On July 10, the pipit nest contained three eggs, and though there was no pipit on the nest "island," one was heard singing to the right. The pair of pipits to which the nest belonged was observed about one hundred yards east of the nest. The male sang considerably from an "island," but the female occupied herself by feeding over the snow at fifty to one hundred feet from the male. Notes of the song (at a distance) seemed to be two: *whit, whit, whit* and *cheet, cheet, cheet.*

On this date, extensive observations were made of the song of the pipit. The bird that occupied a territory on the switchback descended from a song in the sky and alighted on the top of an Alpine fir. The beginning of the song seemed to be a *tweet, tweet, tweet,* given in recitative as the pipit climbed high in the sky. It may also be a *chuweet*—a tinkling note. The song usually accelerated rapidly as the pipit set its wings and glided downward. Wings beat steadily on the upward climb.

On July 11, the pipit nest had four eggs and the bird was on the nest at this time. She left only after the observer was within ten feet. Shortly afterward, however, she began to call—a *peet.* She bounced about within thirty to fifty feet as she had done before. The male was on an "island" just to the eastward, where he was calling and singing. The female responded to his notes with a *cheet-eet-eet* or *cheet-it-it.*

On this date a blind was built of snow, the camera was focused on the nest, and a string attached from the camera to the blind. The pipit worked about the nest for an hour or more, occasionally hopping upon a rock. Although she did this several times this day, she did not repeat it more than once or twice during the entire subsequent period in which she was watched. She finally seemed to lose her concern and stood by, preening her feathers and making no attempt to reach the nest. When the nest was revisited about 6:30 p. m., the female flushed off it and behaved as before.

This day a survey was completed of all the territory likely to be occupied by pipits between Nisqually Canyon and Stevens Glacier. This territory, mostly between elevations of 5,500 and 6,500 feet, consists of small meadows and sparse rock fields with vegetation, and large snow fields. Rims of alpine firs with a little mountain hemlock, presenting Hudsonian conditions, occur frequently above the amphitheater which is lower but nevertheless true Arctic. This

region is truly Arctic because at this date it was still largely snow-covered, while the rims had been bare for some time. These tree-embossed rims encircle old glacial cirques of this region. These cirques or amphitheaters catch more snow than the rims and hence, though lower, have Arctic characteristics in contrast to the Hudsonian of the rims. Because of this condition, pipits nest lower than one would expect to find them. The entire Edith Creek amphitheater or cirque is a semicircle two miles east and west, and about one-half mile north and south.

In this region there were some eight singing males. This great spacing and sparse settling of the pipits was due to the small amount of breeding territory, i. e., sparse vegetation-covered meadows with scattered rocks. Bare rock slides and moraines were numerous and meadows and slopes of comparatively heavy heather were here and there, but these apparently would not do. Of course, snow and ice still covered three-fourths of the area.

On July 12, the pipit was incubating, and three views from the snow blind were secured of her on the nest or approaching the eggs. While the photography was in progress, the female would go onto the nest and almost immediately hop off. Finally she left the vicinity.

On July 13 a new blind was made by digging a hole and setting boards about it to conceal the camera and photographer. This task occupied about an hour during which the pipit was on the "island" for the most part, proclaiming her solicitude by mild notes. She accepted this new blind almost immediately and seemed to give it no especial attention at any time. The lens of the camera, however, which was close to the nest, bothered her a great deal. She would approach within six inches of the nest, cock up her head, notice the camera lens, and rush away, once or twice actually flying away. During many of these approaches she was photographed, but when the photographer waited for her to go onto the nest, he was obliged to watch her come up to it, look at the camera lens, and retreat at least fifteen times before she finally went onto it. That the lens was the troublesome factor was proved by the fact that she showed no fear of the camera except when in view of the lens. She frequently walked within a few inches of the tripod.

In addition to the timidity of the pipit in the early photography, there was the fact that this bird was a wagtail, and as such she presented another big problem in photography, namely, that the tail was almost constantly in motion. This was so troublesome a problem that, although two or three good pictures were secured, the bird

appeared to have no tail because it had been flicked at the moment of exposure.

The male sang frequently in the vicinity throughout this morning of July 13, but never actually visited the nest "island." He most frequently occupied the "island" just to the eastward. That the female was aware of his presence was shown by her notes at the beginning of his songs. She nearly always responded by a staccato *cheep-eep-eep-eep-eep* or *chit-it-it-it-it*. That the male heard these notes was evidenced by a frequent acceleration of his song notes when she called.

In spite of the timidity of the female pipit in approaching the nest, she never missed a chance to chase and capture insects that were near. These she would secure with a decided run, twisting or doubling as the case might demand. Great swarms of small stone-flies were emerging from Edith Creek wherever the snow had uncovered this stream a trifle. These flies were very small and attenuated, about half an inch in length and seemed to be very active, even on the snow.

The pipit nest was approached about 10:45 a. m. on July 14. The pipit left when the observer was within twenty feet, flying off and alighting within fifty feet. She made no sound as she left but uttered a mild *peep* as she alighted. The camera was set up and photography attempted until 1:00 p. m. Five exposures were secured of the pipit, two of her approaching the nest and two on the nest, with one of her just leaving the nest. She approached with her usual timidity, cocking her eye at the camera lens as before, but she reached the nest time after time and retreated without going onto it. Several times she entered the nest depression only to fly off almost immediately. This she did at least three times in rapid succession. Having once settled over the eggs, however, she left with reluctance and no amount of noise, banging, and cloth-shaking would then cause her to flush. Only when the photographer stood up, left the blind, and walked within six feet of the nest did she leave. After each flushing she stayed away from the vicinity for several minutes before again approaching the nest. As on a previous day, she would also be distracted from nest-approach by the presence of an insect after which she rushed with alacrity.

She had a procedure in connection with nest protection which, however, was not elaborately developed. It consisted of leaving the nest in weak concealment, in approaching again with reluctance, and sitting tightly after too prompt a re-flushing. Once she was fully settled on the nest she became completely motionless in spite of

her restlessness, constant teetering, and extensive activity of the previous moment.

The female, in answering the male in song, has several cries or sputters: *tlip, ip, ip, ip, ip, ip, ip, ip* or *pip, pip, pip, pip, pip, pip, pip, pip, pip.* This is the type of sputter made by all pipits as they take off in flight. The male sang most consistently from the "island" east of the nest or from its general vicinity. Only once did he visit the nest "island" and then when chasing another male. All three birds (two males and the female) were in this chase. Whether the male and female were chasing the stranger or the stranger chasing the female with the mate after both, cannot be said.

A second male occasionally sang from the lower amphitheater. Just where his territory was could not be determined. On a second journey through the amphitheater late in the afternoon, the following notes regarding song were made from the efforts of the male that sang most persistently from the switchback region. The usual note was *churee* (which at a distance might sound like *taree* or, when rapid, merely *tree*). This note was uttered between two and four times per second, about two times per second on a long upward climb, or as much as four times per second on the descent. Frequently the rate was three per second.

The pipit usually sang throughout the full flight; often, also, before starting and frequently after alighting. The length of the flight varied from a few feet to several hundred yards, from almost no elevation to at least four or five hundred feet. The bird may ascend almost vertically and alight almost at the taking-off position, or it may describe a huge parabola and alight several hundred yards away. It rises by a steady wing beat at a very steep angle (not closed), pitching from side to side in a tumultuous and dizzy zigzag. Over the snow, the light from beneath is reflected from the ascending bird, usually making the position of the songster easily ascertained (if one's eyes are not already snow-blinded).

Now and then the *churee* note is reversed, thus: *reechu,* giving a totally different effect in the song. The *reechu* is less frequent than the *churee* but is interpolated often in the song. Occasionally the bird stops its singing suddenly while in flight and may make no further utterance or it may start with a different note after complete silence (though only of a second or two), giving the effect of suddenly stopping a phonograph and as suddenly changing the record.

When notes are given at their maximum they may sound, especially at a little distance, like *cit-, chit, chit, chit,* etc. Of two flight

songs of the switchback male that were timed, one lasted for forty seconds and another for a full minute. During the period of half an hour that this male was under observation, he sang many times. The tinkle of the song was very pronounced.

On July 15, the pipit nest was visited at 12:30 p. m. and left at 2:15 p. m. During the period the nest was under observation, six photographs were taken. The female went onto the nest quickly and readily, much more readily than at any preceding time. Only once did she rush off the nest after entering it. She made very few of the preliminary sallies that had been her custom hitherto. She would allow the photographer to approach within six feet before she flushed, and then usually went only ten to fifteen feet. Her only note was a mild *peep,* and she answered the male's notes only once. She left at twenty feet when first approached and alighted thirty feet away. She caught several insects near the nest as she moved about, and entered the nest at fifteen feet as the camera was taken down.

Whether the change of attitude of the female may be attributed to accruement of the incubation instinct or to acquired loss of timidity cannot be said. The former interpretation is probably correct since the invariable response of bird instincts is known.

Between July 15 and July 17, the hundred-mile journey was taken that was necessary to reach the northeastern side of Mt. Rainier. Camp was made on July 17 at the White River Camp at an elevation of 4,400 feet. To reach the interpass between Burroughs and Fremont mountains, a two-thousand-foot, two-mile climb was necessary first to reach Yakima Park and then to make the climb of several hundred additional feet past the very beautiful little glacial tarn called Frozen Lake. Several ascents were made to Yakima Park and to the pipits at the Burroughs-Fremont Mountain interpass.

In the region of Frozen Lake, on the meadow that lies between Burroughs and Fremont mountains, two pipit nests were found—one by the photographer and one by a companion. One nest contained young not over two days old, perhaps younger. It was in a beautiful setting of yellow heather, a pure index form of the Arctic-Alpine home. This nest contained six young. The female was brooding and left her young only when the nest was closely approached. The other nest, with four eggs, was under leaves of the purple aster. The incubating pipit left the eggs when the observers were within a few feet. These nests were found on July 17, at an elevation of 6,500 feet. On this date male pipits were in full song.

On July 18, the day was spent in camp, concerned chiefly with

cataloging developed negatives. On July 19, a trip was made over Burroughs Mountain, and although a pipit voice was heard, the fog was so dense that observations were severely restricted.

The two known pipit nests were visited at 1:30 p. m. on July 21. On this date only two songs were heard up to 6:10 p. m. Although the incubating bird was not seen to leave her nest, the four eggs were warm. Upon the observer's return to that region at 5:00 p. m., she sat until he was within four or five feet and then went without a sound, flying fully a hundred feet before alighting. In the nest occupied by the young pipits, five were still within the nest, but one was outside, dead. The young, with their eyes opening, responded to any sharp call or cry if sufficient intervals were allowed to elapse between the calls. At this time the young had a faint "peeping" note. It had been learned that the eyes of the Prairie Horned Lark open on the fourth day following hatching. The pipits were, in their behavior, so much like the horned larks that their ages perhaps could be similarly computed.

At this time a hole was dug near the nest, over which a roof was made of the alpine firs from the fir mats on Fremont Mountain. The pipit did not come near in spite of a two-and-a-half-hour wait. She stayed in the vicinity, "peeping" softly the while. At times two pipits were near.

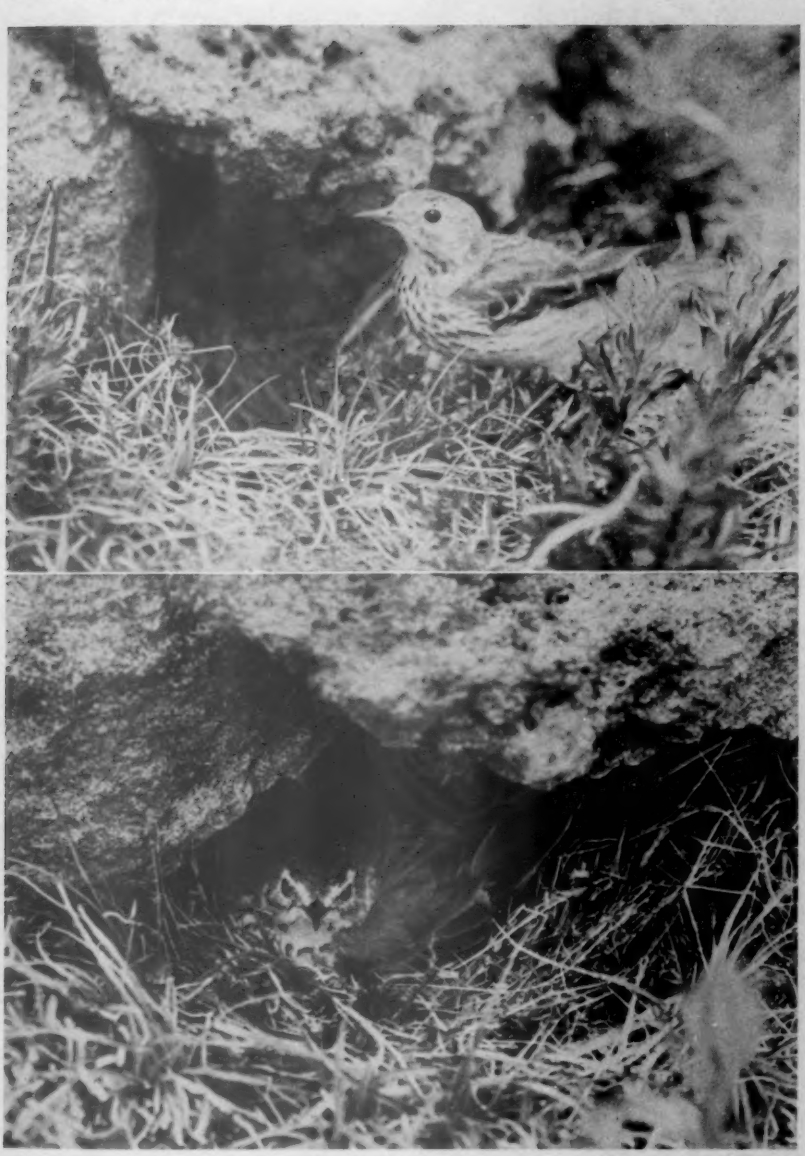
The down of the young pipits was of a lead or blue-gray color, scanty, and restricted to the head and occiput, a strip down the center of the back, the secondaries and their coverts (not primaries), and very little on the thighs.

The evidence at each of these pipit nests was that the cavities had been dug by the adult, for little mounds of fresh soil extended out from the nests. The ground there was especially soft and mellow.

Yellow heather predominated over the nest that held the young, but a little Lyall's lupine (*Lupinus lyallii*) and a plant of potentilla with a purple aster surmounted it. The small mound under the edge of which the nest was placed was beside a small run-off in a gentle slope, with little lateral connections. This drainage accounted for the existence of the mound.

This region is a divide between two drainages and is also a rather wide valley between the two elevations of Burroughs and Fremont mountains. It is comparatively level, has rocks in pavement beds (talus plates, chiefly, with some small boulders) here and there, with rather extensive areas rock-free. There were no rocks in the immediate vicinity of the heather nest, for instance, but the other nest was built in a small rock slide.

AMERICAN PIPIT: (*Upper*) WITH AN INSECT FOR THE NESTLINGS; BURROUGHS-FREMONT MOUNTAIN INTERPASS. (*Lower*) FULLY FLEDGED NESTLINGS SLEEPING IN THE SUN.



AMERICAN PIPIT: (*Upper*) APPROACHING NEST IN EDITH CREEK CIRQUE. (*Lower*) INCUBATING.

There is one copse of alpine firs with a single white-bark pine in a small mat on the west edge of this region, and another single fir. Otherwise the region has no trees, though fir mats ascend Fremont Ridge to a height of five hundred feet above this region on a south-facing slope. There are no trees on the talus slopes of Burroughs Mountain which bounds the region on the south, but this is because it is a north-facing slope.

The meadow had much mountain phlox in mats that, here, had largely ceased to bloom (though in full bloom 500 feet higher); an everlasting that was a predominant plant, though only two or three inches high; large quantities of yellow heather, especially on the west slope, in places completely covering the ground but nowhere more than a few inches high; a yellow composite three to six inches high; Lyall's lupine here and there; a species of *Poa* in tufts; an abundance of sedge and several other plants, but none of it over six inches high at this time and covering the ground quite sparsely, on the whole, in no place more than half covering the ground and usually less. This was the prevailing flora of this Arctic-Alpine tundra.

When the pipit nests were approached on July 23, two adults were observed at a distance of one hundred yards and these swung about over the head of the observer, uttering notes of solicitude, a mild *peep*. Both birds were present at the nest with young throughout the afternoon of this day, but it was not ascertained whether or not both fed the young. No singing was noted. The camera was set up in the cavity beneath the fir blind, and the photographer climbed in beside it. The mosquitoes did, too. They came down the peek-hole of the blind in a steady cloud. The mere opening and closing of the hand would murder some and many others were murdered by deliberate methods, but, though the neck and sides of the face were covered and a steady swing of the arm was maintained, the forehead was soon a row of tubercles. By more mosquitoes, in broad daylight, the photographer has never been attacked.

An hour was spent with the pipits "peeping" near, before one came to the nest. Then one, having nearly reached the nest with a goodly load of food, became suspicious and turned back without feeding. Eventually, however, one began to come in regularly about once every five minutes, and six photographs were secured. The birds removed droppings twice. For the most part, however, the feeding adult would rush to the nest with a small amount of food, push it down a single mouth, and run away without searching for excreta. Only once or twice was more than a single young fed at a visit.

The photographer noted one bolus of excreta dropped by the walking adult not over thirty feet from the nest. The adult walked for long distances to and from the nest and began food-hunting frequently without having taken flight at all.

Throughout the afternoon the female maintained an almost constant "peeping," but on nest-approach would cry *tlyeep* or *cheep*. To this louder note the young responded vigorously, though they did not respond to the solicitous *peep*. Whether they recognized the character of this other note or became inured to the constant *peep* is not certain. Of course, the *cheep* or *tlyeep* was uttered but rarely.

The young did not have a sense of fear on this date though their eyes were widely opened and they were otherwise well advanced. They would respond repeatedly and attempt to seize objects that were thrust their way, and in other ways showed that they had not learned to discriminate sharply nor to have fear.

The adults seemed to have no great fear of the photographer but remained within fifteen to thirty feet (at least one did; the other was somewhat farther) while the photographer focused the camera or changed plates. They had, however, the great reluctance of approach that is necessary for nest-concealment, and they recognized a potential enemy at a great distance. Only two pipit songs were heard during the afternoon, and these from a bird occupying a territory at the foot of Fremont Mountain.

The incubating pipit was not seen to leave her eggs, but they were warm. The nest was approached from behind at 6:00 p. m. when the bird allowed the observer to come within two feet. She then sat for a moment, left without a sound, and climbed more than a hundred feet before alighting. Even then she made no sound. Only four young pipits were in one nest and four eggs in the other.

On July 25, the pipit nest with the young was reached by the observer at 2:15 p. m., and on this date only one adult was observed. This adult gave only one call, a *wheat*. The young had reached a surprisingly large size and seemed almost fully fledged. The concern of the parent bird had become so greatly reduced that the photographer not only left the blind, but focused the camera on the pipits outside, and sat beside his machine while the adult pipit continued to feed the young with the camera and photographer, two ogres, within three or four feet and in full view.

The young at this date nearly toppled out of the nest with eagerness as the adult approached with food. They had a loud *zeet* note. The adult walked to and from the nest for long distances and seemed to gather much food without flying.

On this date, exact feeding records were made from 2:49 p. m. to 4:10 p. m. During this period of 81 minutes, the young were fed 19 times. On three occasions two young were fed. These observations gave an average of 4.3 minutes between feedings. There was not a pipit song throughout the day on this date. All records of the feedings were made from a blind. Some later feedings were made while the photographer sat beside the camera. At one time it was noted that the pipit flew fully one hundred yards to the westward and on return alighted within two or three feet of the nest. The pipit incubating at the second nest allowed a very close approach before she deserted. Shen then flew out of sight without a note. The nest still had four eggs.

The nest containing the young was visited again on July 26. On this date there were four young. Again observations and photographs were made, with the photographer sitting near the nest beside his camera, and again records of feedings were carefully made. The first of these records was made at 1:35 p. m. and the last at 3:09 p. m. During this interval of 94 minutes, the young were fed 18 times, giving an average interval of 5.2 minutes between feedings. On two occasions two young were fed from the same mouthful.

The observer left the vicinity of this nest with its young immediately after the last feeding record had been made. Observations were continued at the top of near-by Burroughs Mountain. On this summit two pipits were observed giving their solicitude notes of *wheat*, and Pallid Horned Larks were also observed here. Although this region seemed to be suitable for nest sites for both of these birds, no nests were found. It should be noted that one pipit song was heard from the vicinity of Frozen Lake in the early afternoon.

The pipit nests were visited on July 27. The incubating female left her four eggs as before, but after flying for a distance of about 200 feet she alighted and called. In the other nest there were only two young. A third was about six inches away, dead and fly-blown. A fourth was in the heather about a foot from the nest. This fourth was replaced in the nest. The living young were lackadaisical under the sun, but as soon as they were shaded they exhibited activity. A young bird, upon turning, threw a bolus of excreta. This the female picked up and carried for a distance of only eight or ten feet before she dropped it.

As the female chased a blow-fly, her efforts brought her beneath the camera tripod and within a foot of the photographer. When she succeeded in picking up something near the nest she brought it

in promptly, though it might be small. She showed the same unconcern of the photographer and of the camera as on the two or three days just preceding. The nestlings on this date were almost devoid of down. They made feeble efforts to capture flies that settled on them. A single pipit on the east bank of Frozen Lake was noted expressing solicitude, and a short pipit song was heard at 4:00 p. m.

On July 29, the incubating bird left as before, and there were still four eggs. This bird had been incubating for a full twelve days. In the other nest there were, at this time, only two young, fully fledged. They showed little evidence of fear and did not crouch. The parent bird came in and fed them while the photographer was near. The young responded when she was near. The region occupied by the pipits had not been visited on July 28.

The White River camp area was left on July 29 and the long journey again made, by car, around the mountain to the Paradise area. Pipits were still in evidence in the Edith Creek amphitheater, but the nest that had given so much information and satisfaction was apparently deserted. The cause of this desertion was never learned.

This apparently deserted nest still had the three striking pipit eggs. They were so heavily covered with dark purplish cinnamon markings that their background was completely obscured. This speckling was thinnest or lightest toward the small end and presented an ill-defined heavier ring about the larger. At the larger extremity the cinnamon again paled to match the small end. In the case of the other two eggs, the cinnamon merely increased gradually in density to the large end.

The nest was not of extensive material. The foundation was of wide blades of sedge (of the previous year) and the remainder, of finer grass (*Poa* sp.) with some horse hair. This nest apparently had required no excavation, but appeared to be in the mouth of an old rodent burrow. There was no rodent activity on the "island" at that time, however, though the snow had gone from the vicinity, leaving rills still partially surrounding the "island," on the east, south, and west.

The flora about the nest was Indian paint brush, then blooming in profusion; two or three clumps of red heather; one tuft of potentilla; a little sedge; a little sparse *Poa* at the tip of the rock where the nest was situated; and a dense cover of what the ranger-naturalist called Alaska spirea (*Lutkea pectinata*) but what a companion identified as globe flower (*Trollius laxus*). This plant was only one or two inches high and, even in blossom, did not send its spiremes to

a height of more than three or four inches. It formed almost a mat on this pipit "island"; indeed it was the most abundant plant over the entire cirque and extended up to an elevation of 6,800 feet and above Timber-line Ridge.

Some pipit activities were observed in the Edith Creek amphitheater and a short song was heard in this same area. This might have meant that re-nesting activity was going forward in the case of the pipits with the deserted nest.

On August 1, a pipit was noted with food where ptarmigans were feeding, immediately below McClure Rock. This may have been a pipit of the Edith Creek territory. By watching this pipit we found a recent nestling, able to fly well. Presumably the bird must have been incubating when we searched this region in early July, although at that time we had not been able to flush the bird from a nest. On this supposition we may conclude that the pipits begin nesting here first at higher elevations, because these regions in places are freed earlier from snow, and that they then follow the season *downward.*

SUMMARY

1. Female pipit observed on July 5, apparently searching for a nest site.

2. The habitat occupied by the pipits on the Paradise side of Mt. Rainier was strictly Arctic because the region was still largely covered by snow.

3. The Arctic-Alpine home of the pipits on the Paradise side of Mt. Rainier was rimmed by Alpine firs and had therefore Hudsonian Life Zone conditions several hundred feet above the level of the observed nest.

4. Alpine fir mats occurred at higher elevation than the pipit nests at the base of Burroughs Mountain on the northeast side of Mt. Rainier because these firs were on a south-facing slope and pipit nests were apparently in distinctive Arctic-Alpine situations, again lower because they were placed in a region which had been covered with deep snow.

5. Males on July 5 in the Edith Creek amphitheater engaged in very vigorous battles.

6. On July 5, pipit songs were noted.

7. Pipit songs were given from the ground as well as from the air.

8. A pipit in flight song sings as it ascends to a height of four or five hundred feet, and sings as it descends, with its wings held up at a sharp angle.

9. Typical pipit flight song seems to be a *churee* uttered at intervals of two to three times per second on the ascent.

10. As the pipit descends it modifies its singing note and seems to sing *reechu.* The speed of utterance increases as the pipit descends.

11. The bird may ascend almost vertically and alight almost at the take-off position, or it may describe a huge parabola and alight several hundred yards away.

12. Songs were frequently heard in early July but seldom in late July. At the latter date, flight songs ceased altogether.

13. At the nest with young critically observed at the Burroughs-Fremont Mountain interpass, the male was not observed to assist in feeding the young.

14. Sexes of the pipits were determined by the behavior of the birds.

15. The pipit nest on the Paradise side of Mt. Rainier was under the margin of a small boulder, and on the Burroughs Mountain interpass one was in a clump of yellow heather and another beneath the leaves of a purple aster.

16. The pipit nest on Edith Creek cirque was placed on a small "island," a bit of ground that stood above the surrounding snow fields.

17. The pipit nest of the Edith Creek cirque was found complete on July 7, but not as yet with an egg.

18. The four pipit eggs in the nest of the Edith Creek cirque were laid at daily intervals, beginning on July 8.

19. Photographs were secured of the incubating pipit of Edith Creek cirque, first from a blind made of snow and secondly from a blind made by digging a hole in the "island" and surrounding it with upright boards.

20. The blind used in working with the pipit on the Burroughs-Fremont Mountain interpass consisted of a hole surrounded by branches of Alpine fir.

21. The nesting pipit, though at first very timid, quickly became so accustomed to the activities of the photographer that a blind became unnecessary. A blind, however, was continued in use on the Edith Creek cirque, but at the nest on the Burroughs-Fremont Mountain interpass, the photographer ultimately came out of the blind and sat beneath the camera tripod; this apparently did not modify the behavior of the parent bird.

22. The incubating pipit showed most concern when she viewed the lens of the camera, and frequently dashed away from the nest when she looked up and saw it.

23. In spite of the speed of the camera lens, the persistent tail-wagging of the pipit gave many unsatisfactory negatives because the pipit appeared tail-less in these photographs.

24. The female pipit of Edith Creek cirque would dash out from the nest to seize a fly and frequently also picked up stone-fly adults from the margin of Edith Creek.

25. Insects appeared to be numerous in the Arctic-Alpine habitat of the pipits.

26. The Paradise pipit nest was apparently deserted when this region was revisited on August 1, and careful descriptions of the purplish-cinnamon-spotted eggs were secured and the structure of the nest noted.

27. The pipit fed only insects to its young.

28. The insects fed were caught usually near the nest.

29. Two periods of nest feedings of the pipit nesting on the Burroughs-Fremont Mountain interpass were carefully timed. These showed that the bird fed at intervals of a little less than five minutes.

30. The pipit always carried droppings away from the nest, though these might be removed only a few feet.

31. Droppings that were extruded several inches from the nest were removed by the parent bird.

32. The pipit nest with four eggs continued to contain eggs until July 29, an incubating period of twelve days.

33. The young in the pipit nest found on July 17 and estimated to be two days of age or less were followed until July 29, a total of twelve days. In the beginning the nest found July 17 had six young, but four of these disappeared from one cause or another.

34. On July 29, the two pipit nestlings which remained were fully fledged.

35. Pipit nests discovered (a total of three) seemed to be in typical Arctic-Alpine situations.

San Jose
California

VARIATIONS IN THE BIRD POPULATION OF THE NORTH-CENTRAL STATES DUE TO CLIMATIC AND OTHER CHANGES

BY EDWIN LINCOLN MOSELEY

THE area where most of our observations on the abundance of birds were made includes Toledo, Bowling Green, and Sandusky, Ohio, extending 25 or 30 miles from each of these cities. In many of the species mentioned here we have evidence that similar changes have taken place over a much wider area, including northern Illinois, southern Michigan, and western parts of New York and Pennsylvania.

EFFECT OF MODERATING CLIMATE

Temperature records in the northern states show that the average in recent years has been higher than the long-time average; in other words, the climate has been moderating. How long this will continue we do not know.

At Chicago, the normal or long-time average is 48.4° F. In the last 18 years the annual temperature has been lower than this only once, and in the 51 years following 1893 only eight times, but in the 33 years, 1845–1877, the annual temperature was below 48.4° twenty-two times.

At Cleveland, the normal temperature is 49.6°. Only four of the 27 years since 1917 have had a lower annual temperature.

"At Indianapolis, February temperatures, 1916–1935, averaged 4° warmer than those for 1896–1915. Between February 19, 1936, and January 2, 1940, reliable thermometers did not reach zero at all; this was the first such long period without any zero weather in that city since the U. S. Weather Bureau was established" (S. S. Visher, Climate of Indiana: 358, 1944).

Glaciers afford a means of knowing climatic trends for much more than one century. A period of years with more than average snowfall and temperatures below normal causes the ice to accumulate and move down the valley faster than it melts away, so that the ice front extends farther down than previously. When the weather becomes warmer and less snow falls, the ice front retreats.

During most of the time for more than half a century, glacial fronts have been retreating in all parts of the world where glaciers have been studied. On the North American continent they are found only in the western part, and little study of their motion was made until the latter part of the Nineteenth Century. John Muir wrote: "All the glaciers that have come under my observation in southeastern

Alaska have retreated and shallowed since first I became acquainted with them in 1879 and 1880."

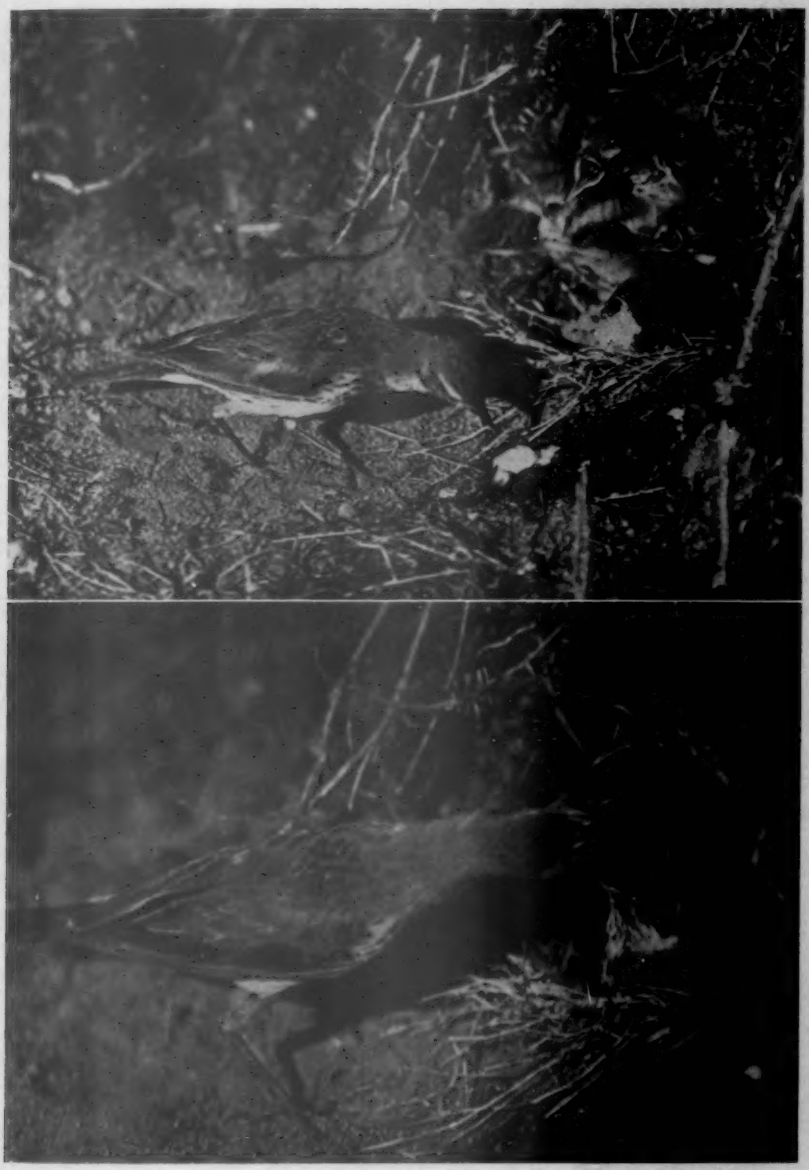
In western Canada, Montana, and the Pacific states as far south as southern California, very few of the glaciers show evidence of advances in recent decades. Nearly all of those whose fronts have been surveyed show retreat, and the rate of retreat has recently shown a marked acceleration.

In the United States, "the annual losses of ice have been much greater during the 1920's and 1930's than during the decades immediately preceding. Three small glaciers in Oregon and several in California have entirely melted away in the past 25 years and those in Glacier National Park and in Montana are wasting away at a rate which, if continued, will result in their total extinction within the next few decades" (François E. Matthes, Hydrology: 195 and 196, 1942).

Since the Wisconsin ice sheet started its retreat from its southern limit south of Dayton, Ohio, something like forty or fifty thousand years ago, there have been periods when both the continental glaciers and the mountain glaciers readvanced and again covered parts of the land which had been freed from the burden of ice.

Studies by botanists of the pollen in peat bogs in Ohio, Indiana, Sweden, and other parts of North America and Europe have confirmed and supplemented conclusions based on the study of glaciers. Fir, spruce, and many species of pine can stand more cold than hickory, oak, or maple. Microscopic examination of the pollen in successive layers of the vegetable matter in these bogs makes it possible to infer what changes of climate have taken place.

For thousands of years after the continental ice sheet had disappeared from the northern states, the climate was milder than it is now. About 2000 B. C., conifers began to crowd back southward the deciduous trees which had long thrived in the mild climate. This cool period continued, with numerous brief interruptions, until about 1600 A. D. Then it became still colder; glaciers in Switzerland overran villages and land where forests had been growing for centuries. When our ancestors first landed in New England and New York they encountered a more rigorous climate than had prevailed there in previous centuries. In the 1850's it became much warmer and there was a rapid retreat of glaciers. Since then it has been cooler for a few years at a time, but not so cool as in the Seventeenth and Eighteenth centuries. During most of the past quarter century the weather has been rather mild.



AMERICAN PIPIT: (*Upper*) PARENT PREPARING TO REMOVE A BOLUS OF EXCRETA. (*Lower*) THRUSTING AN INSECT TOWARD THE BACK OF A NESTLING'S MOUTH.

Records of temperature have been kept at a few places in the eastern part of the United States since early in the Nineteenth Century. Those at The Marine Hospital, Ft. Columbus, New York City, cover the period 1822–1874. In the first eight years of this record the average temperature was higher than in any decade that followed. The U. S. Weather Bureau records at New York started in 1871. They show that in that city annual temperatures continued below normal in most of the years to 1897. After that a majority of them were above normal. Likewise, in the North-Central States, relatively cool weather prevailed until sometime in the 1890's.

At New York City, the warmest of all decades was 1930–1939, with an average of 53.7°. In 1830–1839 the average was 2.9° lower; that is, 50.8°. This corresponds fairly well with the rate of change at Cleveland where the average, 51.38°, for the period 1931–1942 was 2.13° higher than the average of 49.25° in 1856–1870. In both of these records I have made due allowance for the difference in location of thermometers. The records of Gustavus A. Hyde at Cleveland extends from 1856–1906, and so overlaps that of the Weather Bureau for many years, giving a good basis for comparison. His instruments were furnished by the Smithsonian Institution.

The range in annual temperatures is much larger than that of decades—seven or eight degrees at places with long records. Changes of climate such as these might have little effect on the bird population in a region where nearly all of the winters are mild, but the area whose bird population we are considering lies mainly between the 40th and 43rd parallels. Throughout the greater part of it the mean temperature from mid-November to mid-March is not very far from 32°. In those winters when it is three or four degrees lower than 32°, snow may be expected to cover the ground during a much larger part of the time than in those winters when it is a few degrees above 32°.

We have records of the amount of snowfall at many places since early in this century or the latter part of the Nineteenth Century. Of the twenty-six years since 1918 nineteen have had less snow than the long-time average in Ohio and twenty had less in Indiana. In nine of the seventeen that were below average at Toledo, the amount of snow ranged from 12.2 inches to 21.1 inches; the average, 1885–1942, was 30.4 inches.

In the winters, 1885–1886 to 1917–1918, snowfall was above average at Toledo 22 times; that is, in two-thirds of the whole number. In each of eight of these winters, more than 40 inches of snow fell.

In the winter of 1895–1896 there was five times as much as in the winter of 1918–1919.

In some periods of a decade or two, most of the years have had average monthly temperatures in the two coldest months several degrees below 29°; in other periods of similar length a majority have had averages a few degrees above 29°. Such differences affect our fuel bills to the extent of 25% or so.

The fuel on which a bird depends is the food it eats. When the food is cold, some calories are lost in warming it. A few degrees would not amount to very much were it not for the latent heat in unfrozen food and the lack of it in that which must be thawed out inside of the bird. A large part of the food of birds yields less than 700 calories per kilogram. If the food is frozen, about 80 calories are consumed in thawing it out. A coating of frost or ice may still further reduce its value. If the bird must find and dig out the food from under the snow, its troubles are greatly increased.

NORTHERN BIRDS WHICH FORMERLY WERE OFTEN SEEN IN OHIO IN WINTER

Dr. Carl Tuttle, a former member of A. O. U., has lived in Berlin Heights, Erie County, Ohio, for more than eighty years. He writes: "I distinctly remember when I was 15 years old or so of seeing every winter flocks of Snowflakes. In the last 25 years I have not seen any."

At Three Rivers, St. Joseph County, Michigan, Oscar M. Bryens kept a record of the number of birds of each species that he saw in the winters of 1925–26, 1926–27, and 1945–46. He was away in the intervening winters. He saw Snow Buntings in each of the first two winters, including 97 birds on March 3, 1926, but none in the recent winter.

Elsewhere in the latitude of Toledo these birds, as well as Lapland Longspurs, Northern Shrikes, and Northern Horned Larks, were formerly seen by many bird students in winter, but in a majority of recent years they have been relatively scarce. However, the largest number of Snow Buntings ever seen in one day in the Toledo area was January 31, 1943, when Mr. and Mrs. Fred Stearns saw about 5,500 at Bono.

The common Redpoll has been rare in Ohio for more than half a century. In Dr. Wheaton's time it was a tolerably regular winter resident in northern Ohio. Lynds Jones, who came to Oberlin in 1890, says: "Previous to my residence in Ohio this species was reported as being common in the region of Oberlin nearly every winter." The numbers of Redpolls observed in the last ten years

seem to have been even less than before. In the recent winter Mr. Bryens saw none in St. Joseph County, Michigan, where he saw them on 32 days in the winter of 1925–26—78 birds March 17, 1926.

SOUTHERN BIRDS WHOSE RANGE HAS BEEN EXTENDED NORTHWARD

"In Finland the warmer climate of the past fifty years has caused the influx of birds from the south." In this country the northward extension of habitat has undoubtedly been favored by the milder climate, especially in the case of those birds that winter near the northern limit of their range. A factor that may have been more potent in bringing about the change is the food supply provided by man purposely or otherwise.

In western New York, Cardinals are still uncommon but increasing. There has been a notable increase all the way from Pennsylvania to Illinois. Only two of the many persons consulted have reported their numbers unchanged. In the Christmas bird census at Cleveland, 103 Cardinals were counted in 1940, and farther south at Buckeye Lake, Ohio, 309 were counted in 1943. Most of the time in winter, 25 or more live within 100 yards of the home of Seymour Holloway near Swan Creek, southwest of Toledo. In 1885, when I went to Grand Rapids, Michigan, to teach zoology and other subjects in the high school, the only Cardinal which the naturalists of the Kent Scientific Institute knew about had been seen not long before in the yard of Dudley Waters. At the present time hundreds of Cardinals are living in and near that city. Milton Trautman writes: "In 1925 I found Cardinals north of Grayling, Michigan, but after the 1936 winter they seemed to have been frozen back at least 100 miles to the south."

Between 1860 and 1900, most of the families in Columbus, Ohio, are said to have had a caged Cardinal. John Frey, who then made a business of trapping Cardinals, told Mr. Trautman that trappers had extirpated these birds in a 50-mile radius about Columbus and he had to go into Adams County, Ohio, and to Kentucky to trap his Cardinals. Probably something similar occurred around other cities in about that latitude. After trapping ceased, the wild birds rapidly increased. The cutting of the forest followed by cultivation of the land made it possible for many more Cardinals to find food. Before that, buckwheat, corn, sunflower, and many kinds of weed seeds were not available in great quantities.

When a large number of people became interested in providing food for Cardinals, the birds were quick to respond and most of the other species which were attracted to the feeding shelves were unable to displace them.

Wild Mockingbirds were seen throughout the year in northern Ohio and even in southern Michigan for years before the beginning of the present century. They are still scarce so far north, but have become fairly numerous in recent years in the vicinity of Indianapolis and Columbus, and have extended their range northward in Pennsylvania and New England.

Dr. J. P. Kirtland in his catalog of the Birds of Ohio, published in the Geological Survey, in 1838, does not include any kind of wren; there may have been none before there were buildings in Ohio. The House Wren was first noticed in Dekalb County in northeastern Indiana in 1883, and until about that time there were areas in Ohio and Michigan where they were rarely, if ever, seen. Now many make their home in the woods as well as where man has provided shelter. In the Southern States the Bewick Wren and Carolina Wren have long made their homes near buildings. The northward extension of the range of the former started as early as the 1870's and the latter as early as the 1880's. Since the extremely cold period in the winter of 1936, the Carolina Wren has been scarcer than before. They are seen occasionally as far north as Grand Rapids, Michigan. Bewick's Wren has made a steady increase at Lancaster, Ohio, in the last four years (Charles Goslin). It has also increased near Cleveland (J. P. Visscher).

In recent years the Hooded Warbler and the Prothonotary Warbler have been nesting in the North. At many places in southern Indiana, the Prothonotary Warbler was first noticed in the 1880's.

The Tufted Titmouse has long been common in a considerable part of Ohio and Indiana. In recent years, the number in the northern parts of Ohio and Illinois has become very great, and they have extended their range northward in Michigan and New York State. In woods near Toledo, the loud call of the Titmouse is likely to be heard oftener than that of any other bird except the Blue Jay.

Wood Thrushes in the past twenty years have been more numerous than formerly in the northern part of their range.

Robins and Bluebirds are now less rare in the North in winter than they used to be, and the former have been unusually numerous from mid-March until late in October.

Little Blue Herons are quite irregular in their visits to northern Ohio. Some have been seen in late summer in a majority of the years since 1923. In August, 1930, nearly a hundred were observed. Very few have been seen in mature plumage.

American Egrets have been seen in the North more frequently than

Little Blue Herons. Since about 1925, they have been observed in Pennsylvania and northern Ohio. For some thirty years before that they were on the verge of extermination, because women paid high prices to get their ornamental plumes. Karl Bartel reports 100% increase in the Chicago area. Bernard Baker saw American Egrets near Grand Rapids, Michigan, in 1939, 1940, and 1941, and at Grand Traverse Bay in 1940. Some have been seen at Rochester, New York, since 1933. Since 1941, relatively few have been seen along streams in northern Ohio, excepting near Lake Erie. Harold Mayfield and Louis Campbell saw 80 Egrets on September 3, 1944, at Reno Beach, east of Toledo, and 104 on August 22, 1945, in the Erie Marsh in Michigan, north of Toledo.

Like the preceding, the Snowy Egrets were too beautiful to be allowed to live, and were sacrificed on the altar of Dame Fashion. They have long been among the rarest of Ohio birds. Although a few nested in southern Indiana half a century ago, we have no evidence that they were ever numerous north of the Ohio River. There was some increase in their numbers in the Toledo area—1934–1939 (Louis W. Campbell). In these years the summers were unusually hot.

"In 1879 there were but five known records of the Barn Owl in Ohio and none in Indiana" (Amos W. Butler, The Birds of Indiana: 800, 1891). Early in the present century it was no longer rare in southern Ohio and there were also many living permanently in northern Ohio. For quite a number of years past, Barn Owls have been among the most numerous of the larger birds of prey in this region, and perhaps the most useful, considering their numbers, of all our many useful birds. A glance at the feet of these birds will show why they are not fond of winter weather much farther north than Ohio. They remind us of the scantily haired opossum, which had been increasing in the North for many years prior to the hard winter of 1944–1945. So many perished then that several, perhaps many, years will be needed to restore their numbers. For a long time, quite a number of Barn Owls have had their homes inside large trees on one farm traversed by Swan Creek southwest of Toledo. Apparently they all survived the winter of 1944–1945. Their wings enabled them to fly quickly to good places to find food and return without long exposure to the cold.

In addition to the southern birds mentioned above, all of which are attractive or easily identified, there are other species which are known or believed to have extended their range northward—for example, Bachman's Sparrow and Carolina Chickadee. A list of birds

from the Southwestern and Western States which have established homes in some of the North-Central States will be found under the heading, 'Bird Life Affected by the Activities of Man.'

For many years, Mourning Doves have been common over a wide area. Since early in the present century, when they were considered a game bird, their numbers have steadily increased. The extension of wheat acreage in the Northwest has made them one of the most common birds there. The number now in the whole country may exceed that of any native land bird of larger size except the Crow, but probably is less than the number of Passenger Pigeons in the middle of the last century. They subsist largely on weed seeds and scattered grain, doing very little harm to crops.

One reason for the increase of Mourning Doves in recent years is the fact that those which went south to spend the winter were able to return in spring, because people there were too busy with more important matters to use their shells in shooting birds. Moreover, they have escaped the hazards that have decimated those species that habitually nest on the ground, and their nesting season covers several months, some of which are likely to be favorable for rearing their young. Combines, which are now in general use in many states, scatter a large amount of grain. This has increased the food supply for doves. Milder winters and more food have induced large numbers of these birds to stay farther north than formerly. Hundreds of them remain through the winter in the Toledo area. In the 1940 Christmas census, 155 were enumerated there. In central Ohio, the number has been larger than this at more than one place and in more than one census. In Michigan they are often seen in winter as far north as Lansing.

Effects of Wet and Dry Periods

In the entire record of precipitation since the Weather Bureau started in 1871, there were no other three consecutive years in which so much rain fell in northern Ohio each spring as in 1943, 1944, and 1945. At Cincinnati, rain in these three springs has not been surpassed since the early 1880's. The ground was unusually wet also in the nesting season of 1942, 1940, and 1937. Ground-nesting birds must have found it difficult to rear their young in all of those years, especially where the land is as flat as it is around Bowling Green. Hungarian Partridges and Bob-whites have become rare in the Bowling Green area; the numbers of Pheasants, Meadowlarks, Bobolinks, Grasshopper Sparrows, Vesper Sparrows, and Song Sparrows have been reduced. For some of them it seems probable that unfavorable

nesting conditions have been the most potent factor in bringing about the change. Decrease in some of these birds may be due also to the increase of Crows and of those birds of prey which feed on birds—Sharp-shinned, Cooper's, and Marsh Hawks.

The dry summers that characterized most of the twelve years from 1930 to 1941 were unfavorable for many kinds of birds. July, 1936, was hot as well as dry. At that time I spent a few hours on West Sister Island in Lake Erie, where there were thousands of nests of the Black-crowned Night Herons. On the ground under the nests there were hundreds of the young birds dead or dying. These herons do not maintain a colony in one place so long as do the Great Blue Herons. For two or three decades past they have been much more numerous in northern Ohio than they were earlier in the century. The reason is probably better protection for herons in general. In a colony north of Bay City, Michigan, in 1941, Walter P. Nickell estimated there were 300 breeding pairs.

Dry summers are unfavorable for Woodcock, Snipe, Water-Thrushes, and Short-billed Marsh Wrens; their numbers have been much reduced. Other birds were affected by the poor crops. In some of these summers the yield of grain, weed seeds, and berries was much less than usual.

VAGARIES OF THE WEATHER

Some meteorological phenomena not implying any change of climate occasionally cause the destruction of large numbers of birds. On dark, stormy nights at time of migration, many thousands have perished by flying against lighthouses or beacon lights. Birds whose winter range is in the Gulf and South Atlantic States have at times encountered such bad winters there that a majority perished and five or more years were needed to restore their former numbers. This is likely to occur to birds like the Phoebe which feed on insects they catch while flying.

Thunder storms have sometimes killed many birds in summer. In one of the little parks at Sandusky, Ohio, more than a hundred English Sparrows were found dead early one morning. They had drowned in pools of water where the ground was dry the previous evening. A heavy rain after midnight had probably chilled and weakened them. Another downpour before sunrise knocked them off their perches.

At times sleet storms have proved disastrous over a wide area. Milton Trautman's observations of Carolina Wrens in the vicinity of Buckeye Lake, Ohio, illustrate this and also a great reduction in their numbers caused by severe winters. "During a sleet storm in

the winter of 1917–18 a great decrease in numbers occurred and for a few years thereafter only a few pairs nested within the 40 square mile area. By late 1923 as many as 30 individuals could be recorded daily; then that winter another sleet storm greatly reduced their numbers. Other reductions in numbers occurred in 1928 and 1930. In late 1935 I recorded 40 to 50 daily; then came the severe winter of 1935–36 and after that less than 5 per day could be recorded. The numbers rose again to 25 per day in 1941. Then the two hard winters of 1943–44 and 1944–45 so reduced their numbers that in December of 1945 only one bird could be found in the area and it was at a feeding station."

EFFECT OF INTRODUCED FOREIGN BIRDS ON OUR NATIVE SPECIES

In my boyhood days in Branch County, Michigan, in the 1870's, the familiar Chipping Sparrow nested in a bush in our front yard. It was very peaceable. The aggressive English Sparrow was unknown to us. Cliff Swallows, long common in the West, became abundant in Ohio after barns were built there, affording them nesting sites under the eaves and plenty of flies for food. English Sparrows appropriated all the good nesting places they could find around the buildings. They drove these swallows into oblivion. They made trouble, too, for Purple Martins and other birds, but greatly augmented the food supply of Screech Owls and Sparrow Hawks. In recent years the English Sparrows have become less numerous. In the village of Berlin Heights, Dr. Tuttle estimates that less than a hundred of these unwelcome guests still remain. Their decrease may be due partly to the scarcity of horses on the roads, but probably two other factors have had more effect on their numbers. On many farms, straw stacks are no longer seen because the harvesting of small grains is done with combines, and the straw, if it is not left in the field, is baled. Those straw stacks were very useful to the sparrows, affording them protection from storms and predators, nesting sites, and considerable food. Still more important has been the competition of Starlings with the sparrows. This began before combines were in common use in Ohio and affected both country and city.

Starlings were observed in Erie and Ottawa counties, Ohio, by Lynds Jones in 1921. They increased year after year, although the number in the state now may not be greater than it was a few years ago. Their competition with other small birds for food and nesting sites has reduced the numbers of many species, especially those that nest in holes. They are very aggressive birds and seem to delight in persecuting other kinds. One Starling, although it is armed with

a sharp beak, would not make headway against a Sparrow Hawk, a Flicker, or a Red-headed Woodpecker, but by "ganging-up" in large numbers and attacking energetically and persistently, they succeed in driving all of these birds away from the cavities in which they would like to nest. This has been an important factor in causing Red-headed Woodpeckers to become scarce where they were formerly abundant. Decrease in the number of Sparrow Hawks in some areas may be due to the same cause, although they are not always driven away by Starlings.

In many places, Flickers have decreased in numbers. In some places they have held their own, or even increased. Their eviction from nesting sites by Starlings has frequently been observed, but some have eventually found cavities where they succeeded in rearing young. They are very prolific.

Downy Woodpeckers have held their own fairly well. Suet put out by their admirers has helped them. They have also benefited, and so have the farmers, from their persistence in finding European corn borers. While working in his corn field, Seymour Holloway has noticed in one day about a dozen of these dynamic midgets diligently searching for borers in the stalks.

In Toledo there has been a notable decrease in chickadees and nuthatches in recent years. Their numbers have probably been reduced also in other cities where Starlings abound.

Walter P. Nickell of the Cranbrook Institute of Science, near Detroit, writes me: "Not one pair of Bluebirds has nested in the numerous cavities in our old apple tree back of the Museum for at least ten years, while an average of 15 or 20 nests of the Starling are found every year. Three hundred miles farther north, in Charlevois County, Starlings are much less common, and no competition between Starlings and Bluebirds for nest cavities has been observed. Cedar Waxwings are also numerous there."

The decrease in Cedar Waxwings has been observed over a wide area and has probably been caused by their inability to find enough fruit left by the Starlings.

In the last week of March, 1946, I watched outside my window a Mourning Dove as she brought sticks from the yard to build a nest in the crotch of an old silver maple. Despite annoyance from both English Sparrows and Starlings, she was able to complete the nest. A few days later I found, on the sidewalk beneath, two broken eggs which the dove had laid. The large splotch and the shell fragments from one of the eggs were still plain amid the droppings of Starlings

a week later, but the dove had not been seen in the tree since the eggs fell.

Ring-necked Pheasants had become well established in the Bowling Green-Toledo area by 1923, after several attempts to introduce them. The number living in Wood County in the late 1930's was estimated at 175,522. This means about a dozen birds for every family on all of the 4,816 farms in the county, as well as those living in Bowling Green and a score of smaller towns, villages, and hamlets. Most of these birds, when they reach maturity, weigh between two and three pounds. No one expects them to do this without consuming a large amount of food. Barnyard fowls, if not closely confined, obtain considerable food for themselves and in doing so damage various crops. Pheasants have to find nearly all of their food, and the farmer cannot reasonably expect them to make a living on his land without molesting some of the crops he is attempting to grow.

Even if the Pheasants served no other good purpose, their usefulness in protecting crops from the ravages of insects and mice would offset what damage they do to sprouting grain and to unharvested grain. In dry seasons, when water is hard to find, they are likely to pick into many tomatoes and probably some melons, but melon growers have sometimes accused them of eating melons when they were really eating destructive insects. Crows also account for much damage which careless observers have assumed was done by Pheasants. Water in crocks in melon patches is said to lessen the damage done to the fruit by birds. R. S. Phillips of the Findlay Bird Club counted 131 squash bugs which he found in a single Pheasant. The Pheasants are known to eat also large numbers of cucumber beetles, cutworms, crickets, grasshoppers, and other destructive insects.

For a few years past the Pheasant population of Ohio has decreased to such an extent that after the shooting season of November, 1945, the number of birds in Wood County remaining alive and not crippled, was probably less than ten per cent of the average summer population during the 1930's. Naturally, this is a matter of deep concern to sportsmen and to many farmers. An appraisal of the relative importance of the various factors that have brought about this decrease is difficult. I will give some of them in the order of importance as I see it, but many persons who have had more experience with Pheasants will disagree with me.

1. The shooting of hen Pheasants carelessly or otherwise.—Near Toledo a great many Pheasants have been killed out of season by poachers shooting from their parked cars. In the hunting season,

returned soldiers who assumed that their service in the war entitled them to many special privileges have killed hen Pheasants deliberately. In the excitement engendered by the great numbers of hunters in the first few days of the open season, some who are usually law-abiding have killed or crippled hen Pheasants. In Wood County, in the late 1930's, it was found that about forty hen Pheasants were shot for every one hundred cocks bagged. In the past two years the percentage of Pheasants illegally killed has probably been still larger.

2. The alfalfa mill.—These mills take care of a large amount of hay in a short time, using it before it is tall enough to afford good protection for the Pheasants. Much of the mowing is done with high-powered machinery, operating at night as well as through the day. At night many Pheasants are killed. Those nests that escape instant destruction are usually abandoned and the eggs exposed, to be consumed by Crows and four-footed prowlers.

3. The clearing of the banks of ditches and natural streams.—Formerly the saplings, bushes, brush, grass, and weeds were used by Pheasants and by many other birds for concealment and for nesting sites. The birds also found in them a variety of food different from the kinds found in the fields. In order to give employment to persons on relief, the work of clearing the stream banks was authorized by township trustees or county commissioners, and much of it by the C. C. C. and W. P. A. If this work is done before July 10, many nests and young birds are destroyed at the time, but whether it is done early in the summer or later, years are required to restore a favorable environment for wild life.

4. Foxes.—Never before were there so many red foxes in Ohio or Michigan as in the past few years. Tuscarawas County, 75 miles south of Cleveland, had paid bounties on 300 foxes less than two weeks after the commissioners had appropriated the money, January 1, 1946. Union County, 25 miles northwest of Columbus, paid bounties on 92 foxes, November, 1945, to January, 1946. Wyandot County, sixty miles north of Columbus, paid bounties on 43 foxes, November, 1945, to April 7, 1946. In each case the bounty was three dollars. In the flat country south of Toledo, where nearly all of the land is cultivated, foxes have increased but are not so numerous as in rugged parts of the state.

5. Cats.—In many of the Pheasant areas, cats are believed to kill more of the young birds than are killed by any other predator. This is most noticeable near towns. Feral cats, which find their living entirely in the wild, are more numerous than most people realize.

One farmer of my acquaintance killed fifteen feral cats in the winter of 1945–1946, about half of them on his own land in Lucas County. On the Stitt Game Preserve in Wood County, sixty of these pests were killed in one winter. Most of these feral cats were probably born in Toledo and smaller towns. Their owners, having too many, took them miles away to shift for themselves.

6. Hawks.—Most kinds of hawks are not restricted to a diet of mammals, fish, or any one class of animals, but take what is easiest to get. Cooper's and Sharp-shinned Hawks are now numerous in areas where Pheasants abound. Near Lake Erie, Marsh Hawks are most numerous and probably take some young Pheasants. Red-tailed Hawks have increased and are now so numerous in some counties that they are the worst offenders. In Wood County they are believed to kill more Pheasants than are taken altogether by other species of hawks. In winter, Rough-legged Hawks and Goshawks are uncommon or rare in Ohio, but both of these winter visitors have increased in recent years.

7. Crows.—One farmer southwest of Toledo reports finding the shells of Pheasant eggs that had been eaten by Crows—enough eggs to fill a three-gallon pail. "During the period 1912–20 pest hunts were almost unknown in Wood County. After that, thousands of crows were killed at their roosting places and the great rookery on the western edge of Bowling Green was broken up. Pheasants had a chance to hatch their eggs, and almost unbelievable increases were noted in the Pheasant counts" (James Stitt).

8. Bad weather.—In some years spring freshets have drowned out many nests of ground-nesting birds. The unusual succession of very wet springs must have frustrated the attempts of many Pheasants to rear their young, especially where the land was poorly drained. In the very dry summer months, with little dew and the vegetation withered, probably many suffered for lack of water.

The long, cold winter of 1944–1945, with the ground snow-covered most of the time, was hard on Pheasants. Many that would have perished were saved by man's aid. About 400 of the birds found their food in the standing corn on one farm near Monclova. A farmer near Whitehouse had an even larger number feeding during the winter in his field. Illness had kept him from harvesting the corn. He was partly reimbursed by sportsmen's clubs.

9. Other egg eaters.—Bird eggs appeal to the appetite of a great variety of mammals, birds, and reptiles. For many species no other kind of food is more attractive. Pheasants protect their nests from

small intruders, yet the number of Pheasant eggs devoured in the past twenty years in Wood County probably exceeds the number of hen eggs consumed by all the people of any one town in the county, except one or two of the largest.

One of the worst offenders is the opossum. Favored by mild weather for many years prior to the cold winter, 1944–1945, these odd creatures had been increasing in northern Ohio and southern Michigan. In their nocturnal wanderings they find many Pheasant nests. Skunks also are notorious egg eaters; their destruction of Pheasant nests has been noticed in many places. However, their number in the Toledo area in the past few years has been less than formerly. Farmers have attributed this to the multitude of opossums; they are believed to devour skunks in their burrows when they are hibernating. Because nearly all the opossums perished in the winter of 1944–1945, the young skunks born later came through the following winter unmolested. At any rate, skunks have recently been observed in unusual numbers.

Raccoons were quite numerous in 1945. Unlike opossums, they are well protected by fur coats and can hibernate for long periods of time in hollow trees where they are safe from storms and traps. Opossums are southern animals and seem to be incapable of going long without food. Raccoons are passionately fond of eggs; they found many Pheasant nests in 1945.

Rats, the most destructive of all mammals, probably destroy many Pheasant nests. Stray dogs also are known to find and eat the eggs.

10. Owls.—In the nesting season of 1945, Laurel VanCamp of Genoa, southwest of Toledo, found fifteen nests of Great Horned Owls. In many places, Barred Owls are more numerous, but they probably do not kill so many Pheasants. A Snowy Owl was shot near Bowling Green, November 20, 1945, when it was carrying a Pheasant. Few, if any, are killed by owls of other species.

11. Automobiles.—These have maimed and killed numerous Pheasants and caused the death of others by aiding those unscrupulous persons who indulge in illegal shooting. "On one Sunday in 1941 I counted 70 dead Pheasants and rabbits between Findlay and Bowling Green; fully half of them were Pheasants" (James Stitt).

PHEASANTS AND NATIVE BIRDS

Where there are not more than twenty Pheasants per square mile, they may have little effect on the numbers of the other species present, but in Wood County there have often been two or three hundred for each square mile of farm land. They have caused a large

increase in the number of hawks, owls, and Crows and a decrease in those species which naturally eat the same sort of food.

In Wood County, in 1945, James Stitt, who for many years has spent most of his time in producing and maintaining the large Pheasant population, received the following reports of birds of prey, mostly from men at the feeding stations: Hawks shot, 671; trapped, 33; owls shot, 19; trapped, 41. The whole number killed in 1945 within thirty miles of Bowling Green probably exceeded three thousand, including those killed by poultry raisers.

Pheasants have been seen eating the eggs of Bob-whites and Meadowlarks, although they may not search for them, nor find enough to change materially the number of successful nestings. Birds whose decrease is probably due in part to the abundance of Pheasants are Meadowlarks, Bobolinks, Grasshopper Sparrows, Vesper Sparrows, and Bob-whites. Even the Sparrow Hawks are less numerous where Pheasants are abundant, probably because their food supply is reduced both by the Pheasants themselves and by the numerous large birds of prey that feed on the Pheasants.

For some years past the increase in the number of predators has been greater than the increase in Pheasants. "The proportion (of predation) rises and falls progressively with increase or decrease in numbers of the available food organisms" (W. L. McAtee).

The great number of hawks, Great Horned Owls, Crows, foxes and other predators in the past ten years may have been more effective in reducing the number of Bob-whites, Hungarian Partridges, Meadowlarks, and other species in the areas having a high concentration of Pheasants than the reduced food supply caused by their presence.

The following abridged statements show some of the conclusions of Professor Paul L. Errington of Iowa State College relative to competitive relations of Ring-necked Pheasants and Bob-whites: "Wintering Bobwhites avoid coverts having many Pheasants, much as they do places overpopulated with their own kind. . . . Even very low densities of Pheasants have their competitive significance to the Bobwhite. . . . Pheasants have displayed vastly more tolerance of crowding than have the Bobwhites."

Both of these valuable birds suffer in cold winters when there is deep snow, unless they can get to ample food supplies provided by man. Of the two, the Bob-white is less hardy and succumbs more quickly to lack of food. Its chief advantage over its competitors in Ohio is that it is protected from shooting. Most of the farmers realize that it is highly beneficial to crops and does little or no harm.

In large parts of the state where Pheasants have not been numerous, the Bob-whites were holding their own prior to the severe winter of 1944–45. In Michigan, also, the shooting of Bob-whites is illegal, and their range has slowly extended northward as far as the Strait of Mackinac.

Crows are not foreign birds, but as trouble makers they are unsurpassed. They have not been scarce within our recollection and have shown a marked increase in Ohio in recent years, despite the fact that a great many have been shot. Their damage to crops has been very great, in many places greater than that of any other birds. They ruin tomato crops by picking into one fruit after another as soon as it turns red. They eat sprouting corn to such an extent that much replanting is necessary to get a fair crop. In some wet seasons, tons of ripening corn have been ruined in a single field by Crows which open the husk and eat the kernels near the top of the ear, leaving the remainder to be spoiled by beetles and fungi. They have continued to seize the eggs and young of various other birds. The increased amount of animal protein available for them has enabled them to produce and feed more young Crows. They watch ducks when they are at a distance from the farm buildings and take their eggs as soon as they are laid.

One Toledo hunter, loading his own shells, claims to have shot nearly a thousand Crows in the season of 1944–1945. I know a farmer who shot at least 150 in the spring of 1945. Some other farmers would have done this if they had had enough ammunition. In general, the farmers are grateful to anyone who succeeds in killing Crows. A few years ago, when shells were supplied to Crow hunters by the state, Max Kempker of Toledo shot between six and eight thousand of these pests each year.

BIRD LIFE AFFECTED BY THE ACTIVITIES OF MAN

DECREASE

Decrease in the numbers of many kinds of birds has been caused by man. The cutting down of forests deprived numerous species of their natural habitat. Because of its great fertility when well drained, the land in the northwest quarter of Ohio was cleared more thoroughly than that in other quarters of the state. It no longer has Wild Turkeys, Ruffed Grouse, Ravens, Passenger Pigeons, Carolina Paroquets, or Pileated Woodpeckers. There are still a few Red-bellied Woodpeckers. They are increasing in eastern Ohio, western New York, and near Chicago, probably because of better protection and milder winters.

In Wilson's time there were numerous Ravens, but no Crows, along the south shore of Lake Erie. Their extirpation in Ohio made more room for Crows, just as the later extinction of Passenger Pigeons gave more room for Mourning Doves. In the museum of Bowling Green State University we have a well preserved pigeon net, about fifty feet long, the owner of which succeeded in catching 292 pigeons at a single throw, thereby beating his father, whose best was an even 24 dozen, or 288 birds. This was probably about 1870.

Paroquets may never have been numerous in Ohio. In 1862 a flock of 25 or more was seen in the Capitol Square of Columbus. A specimen shot near Newark, October 9, 1884, was mounted. When I was teaching at Sandusky in the early 1890's I had a report of a Carolina Paroquet seen six miles south of that city.

Doctor William Graefe collected and had mounted many interesting specimens of birds which are now preserved in the University Museum at Bowling Green. He told me that in 1880 he shot a Prairie Hen near Sandusky. In Ohio these birds may have lived only in those few counties which had some prairie, most of them in the northwest quarter.

Probably most of the species mentioned above would have disappeared eventually as a consequence of the cutting of the big timber even if they had not been hunted, but extirpation of most of them was hastened by man's desire to eat their flesh. Even the Pileated Woodpecker, or 'Logcock,' was a game bird. About sixty years ago I prepared a skin of one I found at a meat market in Grand Rapids, Michigan. These large Woodpeckers have increased in recent years at some places in eastern Ohio and western Pennsylvania, due probably to better protection.

A century ago there were many Bald Eagles nesting near Lake Erie and Sandusky Bay, probably more than a hundred pairs, each using the same nest year after year, as long as it was safe. Great Horned Owls, Barred Owls, Red-tailed Hawks and Red-shouldered Hawks were also common at that time.

Great Blue Herons are still common, but probably less so now than long ago. The largest heronry in Ohio contained 1,118 nests, May 2, 1935; nearly all of them were occupied. This is in Sandusky County nine miles northwest of Fremont. In the Waggoner Woods, where the heronry is now, the birds began to build nests in 1912 or 1913, because the woods three miles nearer to Lake Erie, which had previously harbored them, no longer contained enough large trees. We know that the older site had been used continuously since about 1840. It may have been used long before that.

Close to the Michigan line, sixteen miles west and north of Toledo, is another old colony of Great Blue Herons, where Reverend Hammond counted 214 nests in 1932. Its present location, in woods of John Ford, has been used only about sixty years. This colony previously had to change its site more than once. In 1871, the year of the great Chicago fire, it was so dry in October that forest fires wrought terrible havoc to both human and avian settlements. Up to that time this heron colony had been using tall cottonwood trees in heavily timbered swamp land about four miles northwest of the Ford woods.

The number of herons in these two old colonies has depended largely on the activities of man, especially in the matter of shooting, for they have been able to defend themselves from other predators and have an unfailing food supply in Lake Erie and waters connected with it. Other colonies in Ohio have declined in consequence of the destruction of forests, drainage of the land, and the long succession of dry summers, 1930–1941.

Numerous other birds that lived in the forest—tanagers, vireos, thrushes, ovenbirds, Cerulean Warblers, and others are probably less numerous now. The drainage of swamps has greatly reduced the habitable areas formerly available for Sandhill Cranes, rails, gallinules, snipes, and a number of land birds which prefer to nest near water—Short-billed Marsh Wrens, Swamp Sparrows, and Yellow Warblers. The clearing away of the bushes on stream banks has decreased the favorite nesting sites of many species.

Telegraph and other wires have caused many bird fatalities, especially in the migrating seasons. Red-headed Woodpeckers and various other birds have been hit by automobiles. Both game and song birds have been slaughtered by hunters who depend on their cars to take them to the homes of the birds. The introduction of domestic cats, English Sparrows, Starlings and Pheasants has added to the troubles of many native species.

Guns, nets, and traps have exterminated a few kinds of American birds, have reduced almost to the vanishing point several others, and have materially decreased the number of many kinds. In recent years, many nests of birds that live in the open fields have been destroyed by mowing machines and by plows and other implements used in fitting the land. Introduction of the alfalfa mill accounts for the earlier mowing of meadows with resulting destruction of numerous nests.

INCREASE

On the other hand, many kinds of birds have become more numerous because the activities of man have provided more food for them. In many of the years since Bowling Green State University started in 1914 as a training school for teachers, Golden Plovers have been seen in large numbers, thousands of them in some years. On their way to their nesting grounds in Arctic America they tarry on the rich land around Bowling Green when it is being plowed for corn. Apparently some flocks remain in one neighborhood for two or three weeks. Many of the birds acquire the summer plumage while they are here. Most of them leave before May 10. After crossing Lake Erie they probably do not make such a long stop again until they come near the Arctic Ocean. On their way back to enjoy the mild weather prevailing in the southern hemisphere during our northern winter, a few flocks are usually seen somewhere in the Toledo-Bowling Green area.

Until there were orchards, Cape May Warblers could not have found so many insects during their fall migration. Their marked increase in recent years may be due to the fact that farmers have been too busy to spray their orchards.

We have previously mentioned southern birds which have extended their range northward both because of a mild climate and more food. The increased amount of food has helped also many other birds—Killdeers, Upland Plovers, Pectoral Sandpipers, Tree Sparrows, Juncos, and other birds which had always been here for at least part of the year.

Destruction of forests, followed by cultivation of the land, made Indiana and Ohio attractive to birds which had previously lived only on the prairies or plains. A number of plants not found in forests, but common in treeless parts of the West and Southwest, migrated eastward and northeastward after the land was cleared. Some came in baled hay or in bedding for cattle, others as impurities in seed shipped eastward for planting. Where empty cars which had carried loads of wheat were swept out, unfamiliar weeds sprang up. Many kinds were brought by the wind. Various grasses, sunflowers, and other composites, pigweeds and amaranths, and plants of the mustard and legume families which had been common in the West were brought here in one way or another and added to the food supply of native birds as well as of those whose homes had been where the plants came from.

Examples of birds formerly unknown or merely accidental east of

the Illinois prairies are the Dickcissel, Lark Sparrow, Western Henslow's Sparrow, Leconte's Sparrow, Nelson's Sparrow, Western Meadowlark, and Yellow-headed Blackbird. Most of these birds are still uncommon as far east as Ohio, but the Western Henslow's Sparrow nests in considerable numbers at some places in Ohio and Pennsylvania and has increased also in New York State. Prairie-Horned Larks have long been common in open places, but until the land was cleared there were none within 300 miles of Toledo. Western Meadowlarks have been observed in larger numbers, 1938–1945, in Michigan, and near Indianapolis and Chicago.

Man has also purposely augmented the food supply of birds. He has left, in fence rows and hedges, weeds and shrubs whose seeds or fruits are relished by the birds. He has planted sunflowers and numerous other herbs, shrubs, vines, and trees to provide food for them. Man has aided the birds in other ways. Shelter of plant growth on the borders of fields, nesting boxes, feeding shelves, and drinking and bathing places have added to their safety and comfort. Putting out food for them has enabled many to survive in bad weather.

Many kinds of birds are safer when living near man. He no longer confines them to cages to hear them sing. In this country, except in lawless communities, he does not shoot song birds for food or because he has no other living creatures to shoot at. This changed attitude toward birds has come about mainly in recent decades. Much credit for it is due the Audubon Societies and other associations for the protection of birds. Probably even more has been done by the schools, many of them aided by natural history museums. They have succeeded in getting the children interested in finding out more about the life of birds and in that way becoming more sympathetic toward them.

Bowling Green
Ohio

BARON VON PERNAU, PIONEER STUDENT OF BIRD BEHAVIOR

BY ERWIN STRESEMANN

HARDLY anyone interested in the study of bird behavior will have heard of Ferdinand Adam Pernauer, Baron von Perney. His name has never been mentioned in any of the treatises on the history of ornithology, and his writings have remained in almost complete obscurity until quite recently, yet he deserves to be ranked among those who paved the way for the modern methods of inves-

tigating bird life; his originality is comparable only to that of the most eminent promoters of this branch of science—Altum, Heinroth, Eliot Howard, Edmund Selous—not to mention those still active in our midst.

The aim of descriptive biology is to register facts, while a student of behavior, passing beyond the mere descriptive stage, endeavors to find out the causes of behavior, using as his methods comparison or experiment or both together. No wonder, therefore, that behaviorism developed only when scientists, after a century or more of registering facts, no longer wanted to know only what is going on, but also why the actions take this and no other course.

The more astonishing it is that already in the early 18th Century there lived a close observer of bird life who found satisfaction in comparison and, as we would call it nowadays, causal analysis. The study of the biology of birds was, at his time, almost a virgin field. The few books relating to birds were more or less concerned with grouping them according to their external features, like Willoughby's 'Ornithologiae Libri Tres' (1676), or if they entered on the subject of life history, it was still done in a rather superficial way and with scanty personal experience, like Gesner's 'Historia Animalium' (1555).

Pernau had practically all the boundless freedom of the first explorer. What he knew and recorded were the fruits of his own efforts; how to deal with the facts was left completely to his ingenuity since no predecessor had developed a method and, by so doing, curtailed the inventive activity and variety of investigations of his successors. He found himself in a position held later on, in the field of morphological facts, by Linnaeus.

When Pernau, in 1702, started writing about birds, no attempt to classify them according to relationship had yet been published in Germany. This was a subject which fascinated him and, being a close observer of the living animal rather than a cabinet zoologist, he proceeded to group birds on the basis of their behavior. With this method he became the forerunner of a now flourishing school.

Before quoting some of the choicest samples of Pernau's skill as an observer and interpreter, it seems indispensable to give a few biographical and bibliographical details. For a fuller statement, see the writer's articles in Journal für Ornithologie, 73: 603–621, 1925, and 74: 688–689, 1926.

The hero of this appreciation, Johann Ferdinand Adam Pernauer, Freiherr von Perney, Herr auf Rosenau, was born November 7, 1660,

at Steinach in Lower Austria. When he was a boy of about ten years, his family, because of its Lutheran faith, had to leave Austria and settled in Franconia. Here Ferdinand Adam, at the age of 16 years, entered the University of Altdorf near Nuremberg, at this time of high reputation, and here he obtained his doctor's degree. There followed the career of young men of wealthy nobility—various positions at court and in government, and travels to distant countries like Italy (1684), France and Holland, all of which helped him to become a man-of-the-world. Gifted as he was, he became highly interested in the literary productions of some of his great French contemporaries, and his translations of Madeleine de Scudéry's and Boileau's selected writings were by far the first to appear on the German book market (1682, 1694). In 1692 he married Maria Elisabeth Hendt von Römingsdorff, and soon afterwards seems to have acquired the manor of Rosenau, near Coburg, where he lived until his death on October 14, 1731, mourned by his widow who survived him by 23 years.

Though continuing to hold high and responsible positions at the court of the Duke of Coburg and Gotha, it was the study of nature, and in particular that of birds, to which he became fully devoted since living the country life at Rosenau. This was, he realized, the best antidote against the depravity of his time, and his ardent desire to help others out of the general breakdown of morals became the principal motive of his writing books on birds. He never entered his name on the title page, refusing, as he put it himself, "to hunt after honors with this printed work." In the 1707 edition of his first book the author presents himself as "A fancier contemplating the creatures made by God beside us human beings."

All his books remained anonymous for more than 200 years, when the present writer succeeded, in 1925, in unravelling the mystery.

In 1702, Pernau's first book on birds was published without the author's consent. It bears the title:

Unterricht / Was mit dem lieblichen Geschöpff, denen Vögeln / auch ausser dem Fang / Nur durch die Ergründung Deren Eigenschafften / und Zahmmachung / oder anderer Abrichtung / Man sich vor Lust und Zeitvertreib machen könne: gestellt Durch den Hoch- und Wohlgebohrnen Hn. / Herrn v. P. . . . / Freyherrn. Anno 1702. [small 4vo, 94 + 12 pages.][1]

There followed a second (authorized) edition, considerably augmented, in 1707, published at Coburg by Günther Pfotenhauer [8vo, 240 + 62 pages].

[1] Instruction / What pleasure may be derived / from these charming creatures, the birds / besides their capture / also through a thorough study of their habits / as well as their taming and training.

The third edition, containing material additions, appeared at Nuremberg in 1716 (P. C. Monath, publishers) under the new title:

Angenehmer Zeit-Vertreib, welchen das liebliche Geschöpf Die Vögel, Auch ausser dem Fang / in Ergründung deren Eigenschaften / Zahmmachung oder anderer Abrichtung / dem Menschen schaffen können; Mit vielen Anmerckungen versehen / und mit schönen Kupffern gezieret / Durch einen Die erschaffenen Creaturen beschauenden Liebhaber. (8vo, 318 + 49 pages + Register.)[1]

This was so well received by the public that Pernau decided to add a second part to it, thereby making use of many additional experiences. He gave it the title:

Angenehme Land-Lust / Deren man in Städten und auf dem Lande, ohne sonderbare Kosten, unschuldig geniessen kan, oder von Unterschied / Fang / Einstellung und Abrichtung der Vögel [etc.]. Franckfurt und Leipzig, zufinden bei Peter Conrad Monath, 1720. [8vo, 512 pages.]

All these editions are extremely rare now, especially those of 1702 and 1707, of which I could only trace three copies in German libraries.

Nothing could introduce us more fully into the scope of these books than the author's own remarks, written in that somewhat long-winded German of baroque times and thereby hard to translate.

"Many experiences have taught me that the delight searched for *in rebus naturalibus* is not subjected to such instability as are those *divertissements* that are based on human invention only, like playing and such like. The provincial nobility are mostly fond of hunting; but very few of them gain thorough knowledge appertaining to it. And because a deer yields more than a lot of partridges, it is impossible to convince many of them that, compared with the joy of seeing a stag collapse at the report of the musket, the investigation of the nature of various birds should not be something paltry. But ignorance would not have reached that mark yet if the contempt of physical studies were not more deeply rooted and would only lead to preferring, when dealing with natural things, that which best fills the pan and the purse. But the evil sticks far deeper. In high places people are not at all ready to believe that the delight which is offered by natural subjects, nay, that the inspection and examination of the trees, herbs, flowers and innumerable other products, that the investigation of the nature of the beasts, birds, fishes, of the metals and minerals and so on, is apt to lead young people much nearer to morality than playing, dancing and other vanity, by which the mind

[1] Agreeable Pastime / which the lovely creatures, the birds / can give man / besides their capture, the study of their characteristics / their taming or other training. . . . By a fancier who observes the living creatures.

[2] Agreeable Country-Pleasure / which one can enjoy innocently and without expense in towns and in the country / Or all about the differences, trapping, taming and training of birds.

of young folk becomes mild and friendly in outward appearance while in reality obdurate, haughty and conceited. Who would like to trouble a prince with exploring the properties of natural objects? Who would charge him with reflecting on the culture of trees, or with learning the differences of birds and fishes? Or with taking pains to understand what his gardener's reason might be when he transplants the flowers on his pleasure grounds? The world wants to be ruled by Alexanders only. No wonder, therefore, that their countries are sometimes getting too narrow for them and the inhabitants are expelled!" [From the "dedicatio" of the "Zeitvertreib," 1716.]

"I feel convinced that, if one would not disdain such-like matter, but instead, in accord with God's will, would encourage our children from the cradle on to admire God's creatures, with which they would have occupation enough for all their lifetime, because their number is uncountable, the devilish masquerades, the vain and often ridiculous pomp, nay even the bloody wars, would soon diminish." [From the preface of the "Unterricht," 1702.]

"The Lord is so mysterious in all his creatures, and his wisdom shines forth so abundantly from those which we take to be the humblest, that man's life is far too short to fathom sufficiently all properties even of a single one. I therefore have often wondered how some authors dealing with such matter dared to promise more than all men on earth, if working together, ever would be able to effect and to accomplish.

"It therefore happens that the known and the unknown, mixed together, are passed off as truth, making the one suspect by the other; the reason is that one wants to remove suspicion of something remaining that one doesn't know. That is something I refuse to do, freely confessing that there are many birds which I do not know at all; others, of which I know the name without being aware of their properties; and others again familiar to me by appearance but not by name—all of which I have reason to pass by. For it is not my intention to describe how to capture the birds; I resolved, instead, to show how greatly Man can delight in these lovely creatures of God without killing them." ['Unterricht': 1, 1707.]

Pernau became thoroughly familiar with bird life by being both a field naturalist and an aviculturist. A bird fancier with marvellous gifts for observing and interpreting facts, he finds his equals in only a few ornithologists of our day, and may be ranked with Oskar Heinroth and Konrad Lorenz. The similarity of his methods to those used by Konrad Lorenz is indeed surprising. The most im-

portant one was that of training birds to fly out and in the cage or aviary at will, and letting them spend some of their day, or even a whole season, in the wild. By so doing, he not only became acquainted with intimacies of bird behavior, but also learned to discern influences of captivity as such. In his time this was as unusual a way of keeping birds as it is in our day, and he had to turn ever again to clever inventions and experiments, all of which he describes in due detail, to overcome the many difficulties. But the satisfaction given by the results made him untiring. The number of birds of different kinds which he kept in this way (besides those always held in cages) must have been very considerable; it included even House Sparrows, which he rightly considered a most remarkable success. What he took to be the finest task of aviculture he himself set forth as follows: "No store at all can be set by the pains taken to breed hybrids, or to make a bird learn a song that is not its natural one. On the other hand, it is a well-founded opinion that one cannot gain a finer pleasure from birds than through taming them and through making them accustomed to flying out and in; for Man cannot possibly render something more perfect than the Lord created it. . . . A Finch, for instance, will learn to imitate some of the Nightingale's strophes, but not with all the vigor and the beautiful alternation that brings about the greatest charm. By taming the birds, however, chiefly if one trains them to flying out and in, one preserves the bird in its natural beauty and will be delighted, besides, by the loveliness of its song, also by the elegance of its colors. Thereby one gains something without losing some other thing; one gains what, according to some, Man lost through the fall; in Paradise the animals did not flee Man, but allowed him to handle them as he liked.

"It is far more curious to send a bird away for several miles (as I have frequently done) and to see it returning to its owner, than to cause it to get another bird's color or song, whereby one certainly will notice that it is borrowed only." [1716, p. 201.]

Besides being an aviculturist, Pernau also was thoroughly familiar with many devices for capturing all kinds of birds, a technique developed to almost a science in his times and, therefore, called "Aviceptology" by some French writers. He frequently refers to a German book about bird catching, Johann Conrad Altinger's 'Kurtzer und Einfeltiger Bericht von dem Vogelstellen' (1577–1637), which, having first appeared at Rothenburg in 1626, had three more editions, the last one in 1688. This way of experimenting, too, led him to understand bird behavior.

In the light of his thorough experiences, Pernau judged all features of bird structure and bird life to be a manifestation of God's never-erring wisdom, and that made him a passionate opponent of the Atheists and Mechanists, who, already in these times, had ventured to explain those facts in their way.

"Nothing can be improved with natural things, for God's Wisdom is without an end." [1716: 148.]

"In all natural matters, one has to aim at keeping to nature." [1720: 365.]

"All that has been made by God completely harmonizes with the life for which it is shaped, even if it seems deformed." [1720: 121.]

"I wonder what the so-called *esprits forts,* those *Messieurs les Athéists,* will have to say! Should they perhaps believe their *Atomi* or grains of dust did cause, through joining by hazard, just the Owl (which has to prey in silence and flies about by night) not to be heard when on the wing, whereas other birds, large and small, cannot fly silently?" [1716: 8.]

Some few quotations from his books will show how far Pernau proceeded in his striving for knowledge, and how sound he was in his interpretation of facts. As an introduction he discusses the many differences of birds as shown by behavior. There are ten main differences of interspecific value, according to him, that have to be considered by the student of bird life. These are: grinding or swallowing the food, ecology, migratory drive, nesting habits and number of clutches, social habits, degree of territorialism, seasonal color changes (bill and plumage), song period, bathing (mostly in water only, but some in sand only, like the larks and the gallinaceous tribe, and others in water as well as in sand, like the House Sparrow and the Tree Sparrow), and manner of feeding their young.

This fascinating introduction is followed by a treatment of birds more or less familiar to the author "by appearances as well as by name," with especially long chapters devoted to the Chaffinch, the Goldfinch, the Greenfinch, the House Sparrow, the Skylark, the Nightingale, and the Partridge. They are teeming with ingenious remarks, strewn in like shining jewels.

A small selection, translated as verbally as seems possible, will best be quoted here under headings from modern terminology.

Behavior an Auxiliary to Taxonomy

"The Mudlark ["Kothlerche," today's Tawny Pipit or *Anthus campestris*] should rather be called Field-Wagtail, because it moves its tail like a Wagtail [*Motacilla*] and because the call note is almost

the same in both when running about with their young on the fields and roads, though by color and by its song flight it resembles a Lark." [1720: 44.]

"The Goldfinches ["Stieglitz," *Carduelis carduelis*], in contrast to the Chaffinches ["Buchfink," *Fringilla coelebs*], carry the food for their young in the crop and not in the bill; it is surprising, therefore, that some people rank them with the finches by calling them Thistlefinch ["Distelfink"]: while the said property (to say nothing of others) sufficiently shows how far the bird is removed from the finch tribe." [1716: 284.]

"As opposed to the Yellowhammer ["Emmerling," *Emberiza citrinella*], the Ortolan Bunting ["Hortulan," *Emberiza hortulana*], if it wants to move quickly on the ground, does not hop but advances by steps." [1720: 125.]

"There are two tribes of rail ["Schnerffen"], those living on the meadows and fields, and those dwelling along and on the waters. With the last-named, one has to count the so-called water-hens of different kinds and the Moorhen ["Blässlein," *Gallinua chloropus*], for they do not belong in fact to the ducks, even though they seem to have some similarity to them as regards their feet and by being able to swim; their proper place is with the rails." [1702: 70; 1707: 211; 1716, p. 268.]

"If one wants to refer several species to one genus, these should at least have a marked similarity of voice and other characteristics." [1720: 117.]

"It is strange that a hybrid between a male Canary and a female Linnet, if set free without one of its kind, will not associate with the Linnets, but with the Greenfinches, from which it can be concluded that the Canaries are more closely related to the latter than to the former." [1716: 58.]

Ecology

"If I knew all species of snipes ["alle Arten von Schnepfen"] and of the so-called "Waterhens," and would describe them with due differentiation according to their characters (as, for example, among the snipes there are some inhabiting the woods, others the swampy meadows, others the dry meadows, others the borders of running water, those various groups being divided again into different species) I could fill several quires of paper about these birds alone." [1720: 347.]

Migration

"It is a very strange opinion if some believe the birds would emigrate, driven away by hunger only. Instead, they are usually very fat when about to leave us." [1720: 35.]

"The Scriptures say: 'The Turtle Dove knows her time.' But it would be a mistake to believe that the bird reasons, as it were, and concludes, 'It is time now!' In fall the Turtle Dove is driven in due time by some secret impulse and obeys it, whereas Man frequently withstands the same." [1720: 36.]

"It has still to be investigated whereto the Nightingale, the Stork, the Swallow, and others may migrate. It can be reasonably judged only that the place where they go must be of the same character as the place they leave. This can be concluded from their habits during migration, for any bird migrates towards places that suit him as abodes." [1720: 37.]

"All our migratory birds follow the same course, directed on fall migration between evening and midday [= SW], in spring, however, between morning and midnight [= NE]." [1720: 40.]

TERRITORIAL HABITS AND FLOCKING

"Not without good reason God has given the Partridge the property to surpass all other gallinaceous birds in its eagerness for being surrounded by its family. When there is snow in winter, a single one gets its food with difficulty, because the task of scratching through the snow cover, especially if it is frozen, is too much for it. If, however, the flock is large, they can work themselves even through the deepest layer of snow with little trouble and so rejoice in the green grain of wheat. On the other hand, the Nightingale is forced, for the sake of her feeding requirements, to chase away her own equals, for if many would stay together, they could not possibly find enough worms and would inevitably starve. Nature therefore has given them the drive to flee from each other as much as possible." [1707: 203; 1716: 242–244.]

"The Chaffinch gives the most pleasure by the males, as soon as the sun in March gets stronger, selecting a special place, just as other birds do, often consisting of a few trees, and by afterwards not allowing another male to show up there. They sing very fervently all day long from the tops of such trees, to induce one of the passing females (that always arrive last on migration) to come down." [1707: 77; 1716: 87.]

"A cock Partridge that starts growing angry and wants to mate, does not allow more than one hen to stay around him, chasing away all the rest, hens as well as cocks, which have to get out of his way farther from day to day. But it is not a single one that starts like this; the mating impulse drives them all at the same time, causing them to lie apart only 20 or 30 paces at the beginning, but after-

wards to increase the distance more and more, until they separate completely." [1720: 410.]

BIRD PROTECTION

"At some places the authorities expect to increase the number of Nightingales by strictly forbidding their capture. This however, is a completely futile measure, founded on conjecture only. Experience will show that, even if such an interdict is kept for many years in succession, the following year only one Nightingale, and never more, will be heard in any garden or shrubbery where one had sung before, unless one increases the number of bushes and hedges. It is true that at places where a Nightingale had been caught after the 24th or, at the latest, the 26th of April in normal years, none will be heard again the same year, and the pleasure will thus be spoiled for the owner of the garden. This is due to the fact that migration had already ceased at this time and, therefore, the vacant place could not be filled. It will, however, not remain vacant for a single day if the trapping is done between April 19 and 26. For it is essential to know that all through migration time (which begins, in fine weather, April 17, 18 or 19 or even later, and lasts, according to weather conditions, for eight to ten days) a Nightingale will appear at exactly the same place where, the day before, one had been caught, until, no later than ten days after migration started, the females conclude it, arriving all together in two or three days. . . . He that wants to see the Nightingales increase around a town need not, therefore, forbid their capture regardless of date, but has only to decree that people should let hedges grow large and thick." [1716: 210 and 218.]

"In spring the young Partridges that failed to find a place at their native ground will all emigrate and disperse for many miles; in the light of this, those persons show lack of experience who believe they can preserve and increase the Partridges by catching only a few of them and by being very careful to spare the adults. They ought to know that an adult cock bird occupies a bigger territory [Platz] every year and, therefore, checks the increase of pairs, and that the young emigrate for many miles, as already mentioned, unless they find an especially good spot near by which has remained vacant. If, however, one removes only the old cocks, some of the young hens will always stay behind if there is place for them. They will mostly pair with strange cocks that come along, and not with their brothers, so to say, for these migrate in advance, as with other birds, and are already gone at the height of the pairing season." [1716: 237.]

SIGNIFICANCE OF CALL NOTES

Species of strictly territorial habits like "the Nightingale, the Robin and the Redstart, which do not allow another bird of their kind to come near, except in spring their female," are devoid of that special attraction call note which is to be found with the species of social habits. [1716: 24; 1720: 76.]

"The Wood-Lark ["Heyde-Lercht," *Lullula arborea*] eagerly follows the attraction call, in contrast to the Skylark that does not care about it; the reason for that difference probably is that God's inexpressible wisdom, which shines forth from the humblest things, did not implant in the Skylarks that method of attracting each other, because they can see their companions on the flat field and can find them without such help, whereas the Wood Larks, when flying among bushes and over completely wild ground, would often lose each other if they did not utter the attraction call constantly." [1702: 46; 1707: 138–139; 1716: 164–165.]

"The Skylark ["Feld-Lerche," *Alauda arvensis*] does not enter the underbrush; instead, on migration, it either flies high in the air in a large flock, or it settles down on open fields. Therefore it cannot easily go astray from its companions and does not need to call them to its vicinity by aid of a special attraction note, and consequently Nature did not supply it with such; for even though the Skylarks do call their companions constantly when rising or on the wing, that is not in reality attracting, as it is with the Wood Lark and other birds, but it only serves to induce flying." [1702: 53; 1707: 156; 1716: 184.]

"The Blackbirds ["Amseln," *Turdus merula*] sometimes call each other, but not with the intention of gathering, but either for inciting each other to fly, or to warn each other, or as a means of threat; for the Blackbirds do chase each other, though not to such a degree as the Nightingales and the Robins." [1720: 73.]

SEXUAL STIMULATION

"Experience has shown [me] that a female pigeon, put in a dovecote together with six single males and trodden now by one, now by another without them billing with her, did not lay one egg in spite of this going on for 14 days; when, however, the other males had been removed and only one left with her, she very soon started billing with him and afterwards copulated; when this had gone on for about six days, she laid two eggs. It seems probable, therefore, that no pigeon would lay without billing, in spite of having copulated." [1716: 301.]

INNATE AND ADOPTED SONG

"One has to consider that a young bird of any species, which neither hears an adult of its kind nor has another young around itself, never will attain its natural song completely, but will sing rather poorly. If, however, there are two young together, one will help the other in composing, until both attain the real song, though much more slowly than if they would hear an adult." [1707: 172; 1716: 200.]

"Birds which have learned the song of another species may, in general, not hear their species' song during their first year at all, or they will drop the adopted song. It is different, however, with the Chaffinch [*Fringilla coelebs*]. A Chaffinch, after having studied the alien song from February to May and being released afterwards, no longer adopts the song of his kind, but will remain inseparable from his mate, if he gets one, and if he does not succeed in this, will utter his adopted song the more fervently, endeavoring to entice the other sex, and does not take time to learn something else. As long, however, as he is kept in the aviary [until May] it is not advisable to let him hear another finch uttering its usual song. (Yet it cannot be denied that some Chaffinches which had learned alien songs to perfection, after having been in the woods for one year had lost them and returned home with the Chaffinch's song.) There is nothing more agreeable than to hang a well-singing Tree Pipit ["Gereuth-Lerche," *Anthus trivialis*], which has a very long-drawn-out song, next to several young Chaffinches. The training starts in February. The young finches will have to be captured, however, in August the preceding year before they have completely molted, or, still better, raised from the nest. If, by this method, one causes three or four finches annually to adopt a Tree Pipit's song (for which purpose one does not need a Tree Pipit at all the next year, but only the trained and imitating finches), one can, within some years, fill quite a forest with such-like song. These finches, trained to leave the aviary and to return to it, if released again after spring migration will spread in the near-by woods and, so to speak, will fill the whole district with their adopted song, and, even if emigrating in autumn, will nest in the same place as long as they live. One can mark them by cutting off a toe, and thereby know them after the song period. The danger of losing them by emigration to another district applies to young birds only; the adults, however, that have already nested once at a certain place, and also the young which had been prevented from undertaking their autumnal migration, either will not migrate at all, or if they do so, will return to their former

place in the breeding season; and even though they are not allowed to visit their window in summer, because, after the finches' nature, there are only one or (on a larger ground) two that nest in the same garden and chase away all the others, they will return there in fall before migration, or in winter after snowfall." [1716: 110–112.]

"It is worth knowing that [semidomesticated] young Canaries reared and led not by Greenfinches [Grünling," *Chloris chloris*] but by Linnets ["Hänfling," *Carduelis cannabina*], if they meet outdoors in the wilderness Greenfinches that are their closer relatives, do not learn the Linnet's song from their foster parents, but the Greenfinch's song. If, however, they happen to hear the song of an adult Canary, placed at home under the window by which they are accustomed to fly to and fro, or behind another window, they all will settle together in the nearest tree and eagerly study it, and instead of adopting another song will learn that of their master so well that the first brood, if caught between St. Bartholomew [August 24] and St. Michael [September 29] and transferred from their freedom into the aviaries, will already sing, though not so loud, yet just as well as the adult." [1720: 405–406.]

Whereas other birds, according to the author's experience, do learn their song by imitation, "the Great Tit ["Kohlmeise," *Parus major*] can produce her notes from nature and does not need to copy it." [1716: 195.]

Reproduction

"The fancier soon will notice how great a difference there is concerning the propagation of Nature's children, whether one sets everything to work after Nature's method as much as possible, thus giving preference to Nature over art, or whether one wants to master Nature through art, which seldom ends successfully." [1720: 397.]

"If asked at what period a female bird will be most worn out—when laying eggs, when incubating, when feeding the young—I should answer that it is laying that tells on her most; incubation, on the contrary, makes the female healthy, as anyone will concur with who is able to perceive in a bird whether it is ill or well. Feeding their young does not exhaust the adults as much as one would expect, for it is a natural performance." [1720: 367 and 382.]

Different Ways of Feeding the Young

"All birds that bite and grind their food belong to the group that feed their young out of the crop, except the Sparrow and the Chaffinch which cannot do so because their nature requires that the young must be fed at first with all kind of insects, as gnats, grass-

hoppers, and the like; such food they cannot carry to the young within the crop as is done by those birds which feed them with seeds only."

"Young birds, which are fed with worms, have not been endowed by Nature with the *instinct* or natural drive to hurry towards their parents, but, instead, the adults fly eagerly towards the screaming young. The cause of the difference is this: A bird, if it feeds from the crop, will hold so much at one time that it is able to satisfy all its young with its load. Therefore the Lord has ordered that they all should fly towards the adult, as soon as the latter gives a sign that he wants to feed them, to accept their meal while sitting around him. A bird feeding with worms, however, is unable to carry more at one time than will be sufficient for one young only; it therefore would be futile if all the young would fly around their parents, considering the fact that not more than a single one can get something at one time, or the adults would have to make a special flight for the food of any one of the young looking for it. Yet the Sparrows form an exception; they, too, are fed with worms and do, nevertheless, fly towards the adults." [1716: 79–80.]

Instinctive or Associative Action?

"He that searches for a proof of animals having some kind of reason, may allow a Marsh Tit ["Hanfmeise," *Parus palustris*] to fly about in his room in which a tree was set where she can live. After she gets used to that room, one has to withhold food from her for half a day and then to strew uncrushed hemp on the table, or on the floor. Immediately the Marsh Tit will come and carry away in her bill three or four grains all at once. Not being able, however, to deal with and to mince more than one grain at a time, she will place all the others on a thick branch next to the stem, and then proceed to eat the first grain, frequently at quite another spot in the room. This done, she will fetch the rest of the hidden grains, one by one, and afterwards more grains from the table. This device of hiding the hemp grains seems, indeed, to prove some kind of reflection and cannot be explained with the *instinctus naturalis.*" [1720: 227.]

How to Train Partridges to Fly Out and In

One can gain much pleasure from taming Partridges ["Rebhuhn," *Perdix perdix*], and if one has a pair one can train them to stay at a certain place continually and allow themselves to be driven into a chamber to which they are accustomed. But it is not necessary to induce such utter tameness; when half tamed, only, they will give even greater pleasure. It only needs putting, in autumn, a pair of

Partridges with clipped wings into a little garden which is safe from cats, close to a field and carefully fenced. Herein one will have to keep them all through winter and to feed them in a corner protected against snow. In April, one month before the laying time of Partridges (which lay at the end of May), one has to pull out the clipped quills from the female. By this procedure she will become able to fly over the fence and to breed outside, but frequently will return to her mate and eventually train her fledged young to stay in the garden, all the day long.

Still better is it to set a hen Partridge with clipped wings into such a little garden, surrounded by a wooden fence, at the beginning of March. After a few days a cock bird will appear which will not leave the hen again, even if chased away twenty times a day. After he has flown in and out in this way all through March and has started to tread her, one must pull out all of the hen's clipped quills within an hour, at the beginning of April. Subsequently the cock will continue his habit of flying in and out through April, too. In the first days of May, however, she will find herself, with her growing quills, capable of flying out of the garden and joining her mate. From that time on, one usually does not see either cock or hen in the garden all through summer and up until late autumn. At the beginning of November, it is advisable to strew there a handful of wheat, and certainly at snowfall, if not even earlier, the cock with the female, and, in case they have reproduced, quite a flock of young, will appear at the old place. By setting free two or three of these young females next spring, one may expect more than one covey in the garden in the following winter, but they will fight each other furiously when they meet.

A device for having tame Partridges fly out and in one's courtyard (just as can be attained with Wild Ducks) is the following. A rectangular place in the court, the size of a medium room, has to be fenced with boards to such a height that no Partridge with clipped wings would be able to escape. This fenced place must be situated at a spot frequently passed by people, in order to make the birds accustomed to being continually close to men; for the same reason the side where people usually pass has to be fenced with boards to the height of three-quarters of a yard [*eine Elle*] only, and the upper part provided with lattice or laths, narrow enough to prevent a Partridge from passing through. At one of the short sides of this enclosure there should be placed, on the outside, a low wooden case, three-quarters of a foot high, with the opening inside, into which

the birds are driven for the night. Over that case a number of vertical bars have to be fixed, with interstices large enough to allow a Partridge to force itself through with some difficulty. To enable the birds to enter the enclosure from the outside by these openings, the case must project outward onto a large shelf, so that they can jump upon it or climb there by a step or chicken ladder. The Partridges that stay inside cannot pass by the openings, for even if they could reach them in spite of their clipped quills, they would find nothing to set foot upon, and would therefore fall backward again.

In such an enclosure a covey of young Partridges, reared all through the summer by a hen turkey in a little garden, must be put as soon as they are fully grown and so well tamed that they will come to take bread from the hand. (That little garden must, however, be close to a spot constantly passed by men and dogs so that the young Partridges will keep their familiarity with them, acquired in earliest youth through being led by a turkey until finally grown, after which time there is no danger that they will turn shy even if they do not constantly see people. It is important, in taming birds of all kinds, to prevent them from getting shy before they molt and attain perfection. Besides, the young Partridges should have become accustomed to the enclosure and the use of its little gates when still half grown, for that is the time they best learn to discover them. This can be accomplished by putting the turkey and her foster children inside the enclosure now and then for some hours.) The quills of all save one have to be clipped. This single one will soon fly over the fence and alternately join the domestic chickens at the court or creep inward again by the said openings. When this has continued for a fortnight, one has to pull out the clipped quills of one of the Partridges, and to repeat this with the next one in another fortnight, and so forth, by this method causing them to attain flight one after another, until the whole covey will fly out and in. If one would start with allowing more than one to fly, these flying birds would get lost by becoming accustomed to some other place; if, however, one bird becomes used to creeping inside toward his comrades twice or three times a day, the next will confidently follow his example when having gained the power of flight after several weeks' interval. In a fortnight, the third is able to do the same thing, then the fourth, and so on, until the whole covey flies out and in. At first one has to drive those that are capable of flight, together with those still flightless, into the sleeping case every night to protect them from vermin, but may cease to do so as soon as they all can take wing. After another week

they all will fly out every evening towards the fields, obeying Nature's drive, and will return again at daybreak to the court and into their little garden where they will run about as tame as the Partridges one keeps in the chamber.

As soon as the pairing time approaches, most of them will stay away, not more than one pair remaining. One may clip the hen of this pair once more in order to take her eggs for resuming last year's procedure by giving the eggs to some domestic hen for incubation and the chicks after hatching to a hen turkey for care.

Late in fall the others will arrive, together with the young they have reared, though grown rather wild. Whenever one notices such a covey it has to be caught, because the tame young reared that year and the wild Partridges would fight each other too violently. [Condensed from 1716: 238–258; 1720: 256–262, 276–278.]

The Problem of the Crossbill's Bill

"It is surprising, and needs investigating, how it comes about that with the Crossbills ["Krumschnabel," *Loxia curvirostra*] the bills are not of one shape; the upper bill turns to the right side in some, to the left side in others. One might discover the cause while they still are in the nestling stage." [1720: p. 209.]

The Mendelian Laws

"Whoever has some experience with breeding canaries will know that, if a white Nightingale (a male) is mated to an ordinary Nightingale (a female), there will result no other than Nightingale of ordinary color in the first year. Next year, however, if one mates a young female of this offspring again with the white male, the white color will appear in some of their offspring, and in the third year (after mating white with white) no others than white birds will result." [1716: 213; see also p. 101.]

Mutations

"The Chaffinch's bill is completely white with some, and dimmed by dark brownish with others, but in any case it becomes beautifully blue in the males as soon as they enter their song period; though once I had a pied male that kept its snow-white bill and nevertheless did sing. It is beyond my comprehension, therefore, how it happens that a snow-white male, which I saw mounted in the house of one of my friends, had a fine blue bill when it died in the song period. It is something to be wondered at, and there must be a special cause why the bill of the pied bird did not turn blue through

song, whereas the snow-white male developed a pretty blue bill like other finches." [1720: 134–135.]

As these proofs will have shown sufficiently, Pernau was far beyond his contemporaries with many of his views and interests, even so much so that his books soon fell a prey to oblivion. Only one of them, the last published (1720), which is of lesser importance than the "Zeitvertreib" (1716), was circulated for half a century or more within the small circle of hunters, fowlers, and fanciers, as testified by Johann Matthaeus Bechstein, who himself prepared a new edition of it that appeared at Nuremberg and Altdorf in 1796 under the title:

> Gründliche Anweisung alle Arten von Vögeln zu fangen, einzustellen, abzurichten, zahm zu machen, ihre Eigenschaften zu erkennen [etc.].[1]

On this occasion Bechstein stated: "I always have been surprised to notice that in all our books on systematic ornithology which have appeared up to recent times, this work has been considered so very little or not at all."

Yet it would be a mistake to believe that this great naturalist had failed completely to stimulate the development of ornithology in Germany, and that all the pains he had taken to encourage bird study and to guide it, had been bestowed in vain. He soon found an admirer and gifted scholar in the person of Johann Heinrich Zorn (1698–1748), whose 'Petino-Theology, or attempt to incite men to admire, love and worship God their most potent, most wise, most gracious Creator, through closer inspection of the Birds' appeared in two parts, published in 1742 and 1743, respectively. This remarkable book of a splendid field ornithologist might never have been written without the encouragement and mental guidance its author had found when using Pernau's books, to which he frequently refers. And both these authors, Pernau as well as Zorn, could not possibly have failed to have a great influence on Bechstein, who is generally held to be the spiritual father of German ornithologists. He will have accepted from these sources as much as he could grasp, leaving the rest—including some very material statements and viewpoints—for a far later period to rediscover and to appreciate deservedly.

Museum für Naturkunde
Berlin, Germany

[1] Fundamental directions for catching, caging, training, taming, recognizing the characteristics of all kinds of birds.

COLOR VARIATION IN SHRIKES OF THE GENUS *CHLOROPHONEUS*

BY JAMES P. CHAPIN

THE varied phases of two of the smaller green bush-shrikes of Africa have already attracted considerable attention. They are so diverse that several were described as species, others as races of species to which they do not belong. These shrikes are referred to the genus *Chlorophoneus* Cabanis by Sclater in his Systema Avium Aethiopicarum (1930), where we find eight species listed. Furthermore, *Laniarius bocagei* Reichenow, though placed by Sclater in the genus *Dryoscopus,* is very closely allied to *Chlorophoneus sulfureopectus,* and differs mainly by the lack of yellow pigment in its plumage.

Pigmentation is unusually variable in this group, and *Chlorophoneus nigrifrons* is known to have one phase in which yellow pigment is so greatly diminished that only the lower back, wings, and tail are greenish, and the breast merely buffy. The eight species admitted by Sclater are now to be reduced, I believe to four; and to these we must add *bocagei.* Three other small species referred by Sclater to *Telophorus* show considerable resemblance to *Chlorophoneus,* but they all have black chest-bands, and *T. quadricolor* is little more than a lighter-colored eastern representative of *T. viridis.* If *viridis* and *dohertyi* are really allied to *Telophorus zeylonus,* the type of the genus, we may yet have to merge the genus *Chlorophoneus* with *Telophorus.*

Chlorophoneus multicolor and *nigrifrons*

The species which first attracted attention to its exceptional color variation is *C. multicolor* of western Africa, and Sclater pointed out that Neumann regarded *melamprosopus* as a mere color phase. Stresemann (1924) had already shown that *nigrithorax* was a mutant of the same species, and now Bannerman (1939) has accepted these conclusions and given additional proof.

In eastern Africa, *C. nigrifrons* was found to show equally diverse coloration. It was long contended that the red-chested *abbotti* and *elgeyuensis* or the buff-breasted *münzneri* could not possibly be conspecific with the golden-breasted *nigrifrons.* But the pattern of the head and the coloration of upper parts were much the same in all of them, and eventually a still more remarkable form with blackish throat and chest was discovered by Moreau and named *nigrescens* by Sclater (1931). The type was a male, taken in company with a yellow-breasted female. Soon afterward, Admiral Lynes (1934) re-

ported mixed pairs of *nigrifrons* and *münzneri* in Tanganyika Territory, and his observations were confirmed by F. Zimmer (1939). As a result, Grant and Mackworth-Praed (1942) came to the very logical conclusion that the four diverse forms of eastern Africa all belonged to the single species *nigrifrons*.

The proportionate numbers of the various phases are not the same in different parts of the range. Black-chested birds so far have all proved to be males, and have been found only in Usambara and on Mount Namuli in Portuguese East Africa. Females as well as males may be reddish on the chest, and such birds are known from the greater part of the range, but not from Usambara. Orange-breasted examples of both sexes are likewise widely distributed. Males of these two bright-colored phases are usually more highly pigmented than females. Buff-breasted birds, of both sexes, are not uncommon in Tanganyika Territory, but extremely rare in Kenya Colony.

Chlorophoneus nigrifrons lives in highland forests scattered from Kenya Colony to the northern Transvaal, and reaches the Upper Katanga. How to divide it into subspecies is a difficult problem, and Vincent (1935) could not find very convincing arguments for upholding *C. n. manningi*. The species does not occupy the highlands of the Kivu District, even though Hartert (1923) described a supposed race, *C. n. conceptus*, from a mountain forest 120 kilometers west of Lake Tanganyika. This locality is on the highland northwest of Baraka. The type, now in the American Museum, is a male with black on forehead and ear-coverts; but it belongs to the species *multicolor*, not to *nigrifrons*. It is not quite adult, and lacks any white on the fore-crown or above the eye. Its green outer rectrices are already more broadly tipped with yellow than those of *nigrifrons;* and some of them are marked with black on the inner webs, proof that the adult rectrices would agree with those of *multicolor* from the same region.

Moreover, the two cotypes of *conceptus*, regarded by Hartert as females, lack the blackish facial markings that are present in adult females of *nigrifrons*. The fully adult male of this same form had been described by Hartert himself as *Laniarius graueri*, from west of Lake Edward, fifteen years earlier; and the type of *graueri* is plainly a golden-breasted representative of *C. multicolor*. Thus *conceptus* is a synonym of *graueri*, and the latter is a valid race of *multicolor*.

Over the greater part of its West African range *Chlorophoneus multicolor* inhabits lowland forest. It extends from Sierre Leone

to the southern Cameroon, the northeastern Congo, and the Mpanga Forest in western Uganda where it reaches an altitude of almost 5,000 feet. Dr. Ansorge found it also at Ndala Tandó in Angola. In the eastern Congo it follows the edge of the main forest southward and occupies many of the forested highlands along the western margin of the Albertine Rift south to the vicinity of Baraka. But it scarcely ascends above 6,500 feet, and has never been taken in mountain forest on Ruwenzori or the Kivu Volcanoes. Neither has it been found in the central Congo Forest or along its southern margin near the Kasai, though it certainly would be expected in the Gaboon.

This western species is known to have a yellow or orange-breasted phase, to which the types of *melamprosopus, zosterops, reichenowi, ituriensis, graueri,* and *conceptus* all belong; and another with brilliant scarlet breast in either sex. The types of *multicolor, liberianus, preussi, batesi,* and *théliei* were all red-breasted. Furthermore, the black-chested phase, named *nigrithorax* by Sharpe, is now known from five specimens, all males and all taken in forested Upper Guinea; so the color variation may be said to parallel that of *C. nigrifrons* in East Africa. Females of *C. multicolor* lack any black about the face, and their loral region changes from gray to whitish as they become adult.

Thus far no color phase of *multicolor* has been recognized which agrees with the *münzneri* form of *nigrifrons* in lacking yellow pigment on its under surface. But when *münzneri* was shown to be a phase of *nigrifrons* and not a geographic race of *C. rubiginosus* of southeastern Africa, doubt arose as to the status of *C. rubiginosus rudolfi* Hartert (1908), which was named from the highland west of Lake Edward. Here again, the type was not an adult male, but had been labeled as a female by its collector. It looks very like an immature example of *C. multicolor,* except that the breast is of a rather rich buff, the throat whitish. A second specimen, sexed as a male but seemingly an immature female, was secured by Rudolf Grauer northwest of Lake Tanganyika, in the same highlands as the type of *conceptus.* In these two examples of *rudolfi* the loral region is not so distinctly whitish as in *C. rubiginosus,* and the tail-feathers are more conspicuously tipped with yellow. All this might have suggested that *rudolfi* is not a race of *rubiginosus,* but just another color phase of *C. multicolor.*

The suspicion should have been strengthened in 1924 when Dr. Moriz Sassi reported that Grauer had collected a fully adult male

of *rudolfi* for the Vienna Museum in the highland northwest of Lake Tanganyika. He called attention to the resemblance in color of its upper parts to the adult male of *multicolor*. But the throat was white, the breast of a delicate salmon color, flanks and under tail-coverts more yellowish and green. We ought to have realized then that *rudolfi* had no close connection with *rubiginosus*.

Fortunately, in 1929, J. Sterling Rockefeller and Charles B. G. Murphy obtained a second adult male of *rudolfi* on the Elila River, near 6,000 feet in the highland west of Uvira. This example is like the one discussed by Sassi, except that even the flanks and under tail-coverts are light salmon-buff. Facial markings, color of upper surface, and the blackish rectrices with broad yellow tips all confirm its specific agreement with *C. multicolor*. It cannot represent a separate geographic race, for golden-breasted individuals have been found in the same district.

So now we can say with certainty that the western species, *Chlorophoneus multicolor,* exhibits four mutant varieties not unlike those of the eastern *nigrifrons:* buff-breasted, golden-breasted, red-breasted, and black-chested. In no one locality, perhaps, will all four be found together; even the proportion of golden-breasted to red-breasted birds may vary geographically.

We may safely conclude that in such cases as this the genes which determine the amount of buff, yellow, red, or black pigment in the plumage are few in number, so that gradual intergradation in color between the various phases is not to be expected. Fertility is apparently not affected by their interbreeding, and the individual bird has no aversion to association with another of widely different color. The chest can be black, it seems, only in males; the character is sex-limited.

In the recognition of subspecies such extreme color variation cannot be used, unless birds of one phase occupy areas from which the others are virtually excluded. In western Africa this is not the case, and I agree with Dr. Bannerman that *C. m. multicolor* extends from Sierra Leone to the region near Mt. Cameroon, and *C. m. batesi* from the interior of the Cameroon eastward to the northern Belgian Congo, also to northern Angola near Ndala Tando. While the latter race would be expected to occur in the Gaboon or Lower Congo, we have no record from those regions. The blacker rectrices of the adult males of *batesi,* tipped with yellow or red, furnish the most reliable distinction. Males of *C. m. multicolor* have greener tails, though the outer rectrices may become rather blackish, and the tips of all are yellow or orange-red.

Both these races, in fully adult male plumage, have a good deal of white just behind the black forehead and extending back in a line above the eye. One might expect intergradation in tail-color in the vicinity of Mt. Cameroon, and this seems to be shown in at least one of the two red-breasted males which Preuss collected at Victoria and which Neumann (1899) named *preussi*. The same is true of a male from Nkongsamba sent to us by R. H. Drinkwater in 1930. Strangely enough, the two red-breasted males from Victoria and that from Nkongsamba have the crown wholly gray. It might seem that *preussi* were a valid local race, had not Preuss also obtained at Victoria an orange-breasted male with considerable white on the fore-crown. Bannerman mentions a specimen of this same phase from Mt. Cameroon with tail colored as in nominate *multicolor*. Males that are not quite fully adult sometimes lack white on the crown, so the proper name for the race living near Mt. Cameroon is still in doubt. It is not altogether certain that the name *batesi* may not have to give way to *preussi*.

It has often been assumed that *C. m. graueri* must be synonymous with *batesi*, and specimens from the northeastern Congo and western Uganda are certainly not separable. Both red-breasted and golden-breasted examples like those of the Cameroon have been secured in the northeastern Congo, near Medje, to the south of Arebi, in the vicinity of Kilo and near Beni. In Toro, Uganda, Jackson secured two golden-breasted examples. But *graueri* was described from west of Lake Edward, in mountain forest; and all the adult male specimens I have examined from there and southward to the highland northwest of Lake Tanganyika, both golden-breasted and buff-breasted, have had a much narrower whitish border on the fore-crown than *C. m. batesi*. No red-breasted bird is yet reported from that area. The type of *graueri* is golden-breasted, with rectrices all black save for their yellow tips. In 1937 I obtained another male, virtually at the type locality, which agrees entirely with the type. Equally adult males from the region northwest of Lake Tanganyika have somewhat more green on their tails. I am convinced that *graueri* must be upheld, as Hartert argued in 1928, but consider the highland west of Lake Edward as its northern limit. The buff-breasted *rudolfi* is only a color phase of *C. m. graueri*. Of this species there are, therefore, three well-marked races: *multicolor*, *batesi*, and *graueri*, with *preussi*, of doubtful status, in the vicinity of Mt. Cameroon.

Chlorophoneus olivaceus and *rubiginosus*

The variable colors of *Chlorophoneus nigrifrons* and *multicolor* raise another question that should interest South African ornithologists. Is *Chlorophoneus rubiginosus* really a species distinct from *C. olivaceus*? These two shrikes are very closely allied, as shown by the facial markings and the pattern of the rectrices. The principal difference lies in the more abundant yellowish pigmentation of *olivaceus* on the whole under surface and crown. The two birds certainly occur together in the forests of eastern Cape Province and Natal. A supposed race of *olivaceus,* known as *taylori,* and having a buffy throat, is said to occupy Swaziland and eastern Transvaal. In Southern Rhodesia and Nyasaland the yellow-breasted *C. olivaceus* is apparently wanting, and *rubiginosus* is represented by the races *bertrandi* and *makawa,* with the pale temporal stripe greatly reduced. It seems to me quite clear that *rubiginosus* is merely a color phase of *C. olivaceus* of which *bertrandi* and *makawa* are northern races. It may be recalled that Levaillant considered the grayer birds to be the young, and the yellower examples the adults of a single species. But the difference in yellow pigment is already evident in the juvenal plumages.

The oldest name in this whole group is *C. olivaceus* (Shaw) of 1809, and one might well ask why *nigrifrons* and *multicolor* are not reduced to subspecific rank? There are still certain difficulties. In southern Nyasaland, where *Chlorophoneus olivaceus bertrandi* and *C. nigrifrons manningi* live in much the same area, *bertrandi* shows a white loral spot in both sexes and there is considerable difference in color between the sexes. The red-breasted *manningi* has black lores, its bill is smaller, and the sexes are very much alike. Such differences seem to preclude their being only color phases.

Otherwise it would be strange indeed that such competent observers as Swynnerton, Vincent, and Benson have failed to note any mixed pairs. Benson (1941) was convinced that *bertrandi* usually lived at higher levels than *manningi* in Nyasaland. Many observers in southeastern Africa have described the persistent and pleasing songs of *"rubiginosus,"* while in eastern Africa *C. nigrifrons* sings less often and varies its soft whistles with clicking or rasping notes. Careful observations on the voices of *bertrandi* and *manningi* were published by Vincent (1935), while in Usambara, Moreau (1933) was unable to find any distinction between the notes of *nigrifrons* and *münzneri.*

Again, in the eastern Congo, *C. multicolor graueri* exhibits marked sexual dimorphism in the color of the face, and the adult male has

black rectrices tipped with yellow. *C. nigrifrons manningi,* occurring a few hundred miles to the southward in the Katanga, differs in both these particulars. If specimens can be obtained in the intervening region, we may learn more about their real relationship. There appears to be a rather wide gap, both in ranges and in coloration, between *C. multicolor* and *C. nigrifrons* in the region of Uganda and Lake Victoria. In East Africa, *nigrifrons* is distinctly a bird of mountain forest; in the Congo and West Africa, *multicolor* is more characteristic of lowlands.

Chlorophoneus sulfureopectus and *bocagei*

Divergences in coloration such as we have been discussing may be shown by individuals of the same subspecies, or they may characterize geographic races or species. In an allied group of shrikes, the genus *Malaconotus,* we find that *M. cruentus cruentus* of the Upper Guinea forests is less washed with red on its breast than *M. cruentus gabonensis* of the Cameroon and Gaboon. Coloration is, of course, a common distinction between species, but then there are usually other differences of pattern and proportions. The yellow-breasted *Malaconotus poliocephalus* inhabits the savanna countries all around the range of *M. cruentus,* and varies geographically in the amount and extent of reddish brown on the breast.

Somewhat the same geographic relations may be observed in the case of *Chlorophoneus sulfureopectus* and *C. bocagei.* The yellower species, *sulfureopectus,* is a wide-ranging savanna bird, its chest orange or light red in most adults. Its distribution extends from Senegal to Abyssinia, and south through eastern Africa to the eastern Cape Province and to Angola, thus encircling the Cameroon-Congo forest, in which *C. bocagei,* shorter-tailed and with no yellow in the adult plumage, takes its place. The young of *bocagei* in barred juvenal dress, rarely collected, have remiges and rectrices lightly washed with greenish on their outer margins, and buffy yellowish tips on most feathers of the upper parts. The lower surface, too, shows at first a strong wash of yellowish.

Anyone acquainted with these two species in life must be struck with the great similarity in their behavior and in their cheerful whistled notes, which might readily be confused if the birds did not live in very different types of country. In the Semliki Valley and in Uganda both occur, *sulfureopectus* in the open acacia and grass country, *bocagei* in the areas of heavy forest. Both species are very apt to use spirally coiled tendrils in building their nests. Both have been divided into subspecies, but those of *bocagei* are even less well marked than those of *sulfureopectus.*

Size, pigmentation, and habitat preferences all serve to distinguish these two as species. But from the vicinity of Entebbe, in a region where both might be expected to occur, a single bird has been described as *Chlorophoneus andaryae* by Jackson (1919). Its sex may be doubtful; its size is small, with wing 79 mm., tail 70 mm., and the upper parts mainly dark blue-gray, with white lores and superciliary stripe. Wing-quills are washed with greenish on the outer webs, outer tail-feathers dusky olive, tipped and edged with pale yellow. The under surface is white with a wash of pale cinnamon on the chest. It should be noted that Bannerman regarded the type as seemingly intermediate between *C. bocagei jacksoni* and *C. rubiginosus.* Jackson and Sclater (1938) have suggested that it may be related to *münzneri,* but no form of *C. nigrifrons* occurs in the lowlands of Uganda. In length of wing and tail, *andaryae* agrees closely with *C. bocagei,* and I feel sure it will prove to be at most an aberrant example—possibly a mutant or hybrid—of the *bocagei-sulfureopectus* group.

SUMMARY

There now appear to be but five species of the African genus *Chlorophoneus.* All have more or less yellow or green in their adult plumage save *C. bocagei,* which must nevertheless be considered a close relative of *C. sulfureopectus* and *C. olivaceus.*

Two species of *Chlorophoneus, nigrifrons* and *multicolor,* are represented by distinct color phases, four in each case, in which the yellow or red pigment may be present or absent over large areas, or replaced in part by buff or even black.

C. "nigrifrons" conceptus is not a race of *nigrifrons,* but a synonym of *C. multicolor graueri;* and *C. "rubiginosus" rudolfi* is merely a color phase of *C. m. graueri.*

C. olivaceus appears to have two color phases, differing by the abundance or the reduction of yellow pigment, so that *rubiginosus* cannot be regarded as a separate species.

C. andaryae is apparently a mutant or a hybrid, closely related to *C. bocagei.*

SPECIES AND RACES OF *Chlorophoneus* CABANIS.

1. *C. bocagei* (*Laniarius bocagei* Reichenow, 1894: Yaunde, Cameroon). The nominate race occupies the forests of southern Cameroon, Spanish Guinea, and northern Gaboon, extending eastward probably to the Upper Congo. Tail of the male black, that of female somewhat grayish. *C. b. jacksoni* (Sharpe) is closely similar, except that the tail is black also in the female. It occupies forests

of the eastern Congo, Uganda, and the Nandi District. *C. b. ansorgei* (Sclater) has the back and rump lighter gray, and extends from northern Angola to the Lower Congo. These races are very slightly differentiated, their limits not at all clear.

2. *C. sulfureopectus* (*Tschagra sulfureopectus* Lesson, 1831: West Africa; restricted type locality, Senegal). *C. s. sulfureopectus,* with auriculars black in males, ranges from Senegal to Uganda and western Kenya Colony. In most of East Africa the reddish band across the chest becomes deeper in color, and the auriculars are not so black. These birds have been called *C. s. suahelicus* (Neumann), but they differ little from the South African *C. s. similis* (Smith). In Angola and the southern Congo, the reddish color on the breast is said to be paler, and *C. s. modestus* (Bocage) has sometimes been recognized. *C. s. fricki* Friedmann of southern Abyssinia and northern Kenya Colony is like *suahelicus,* but seems to have more green on the crown. All these characters are shown well only by adult males, and the geographic variation is not clear-cut. This is the only species living among the larger trees in savanna country.

3. *C. olivaceus* (*Lanius olivaceus* Shaw, 1809: Algoa Bay, S. Africa). Sundevall's *rubiginosus* is only a color-variant, and *C. o. olivaceus* extends from Knysna to Natal and the Transvaal. The supposed race, *taylori* Roberts, needs further study, being based on yellow-breasted birds with buffy throats. *C. s. bertrandi* (Shelley) and *makawa* Benson are found in Southern Rhodesia and southern Nyasaland, where yellow-breasted examples are still unknown, save that Swynnerton (1908) reported "*olivaceus*" as well as *bertrandi* from the Melsetter District.

4. *C. nigrifrons* (*Laniarius nigrifrons* Reichenow, 1896: Marangu, Kilimanjaro). The red-breasted phase was also described from Kilimanjaro as *abbotti* Richmond, and later from Marakwet, Kenya Colony, as *elgeyuensis* van Someren. No satisfactory basis has yet been found for subspecific distinction among the birds from Kenya Colony, Usambara, or the more southern highlands of Tanganyika Territory, where the buff-breasted phase was first discovered and named *münzneri* Reichenow. So aside from *C. n. nigrifrons* with its four color phases, only *C. n. manningi* (Shelley) is admitted as valid, because of the rather dull red of its breast and the small yellow terminal spots on its remiges. No golden-breasted individuals have been reported from the range of *manningi,* though two black-breasted males were secured there by Jack Vincent. The range extends from northern Transvaal and the Melsetter District to Nyasaland, the Katanga, and Mwinilunga in Northern Rhodesia.

5. *C. multicolor* (*Laniarius multicolor* Gray, 1849: West Africa; restricted type locality, Accra Plains). Nominate *multicolor* ranges from Sierre Leone to the base of Mt. Cameroon; *C. m. batesi* Sharpe, with more black on the rectrices, from there eastward along the northern edge of the equatorial forest to the Ituri and Toro in western Uganda. The latter race has also been found in northern Angola. In the highlands of the eastern Congo, from near Lake Edward south to the country west of Uvira, lives *C. m. graueri* (Hartert), with less white on the forehead. No red-breasted or black-chested example of *graueri* is known, and it seems to be the only race with a buff-breasted phase.

PERTINENT LITERATURE

BANGS, O.
1931. A small collection of birds from the Silinda Forest. Proc. New Engl. Club, 12: 70, 71.

BANNERMAN, D. A.
1938. A new genus for Bocage's shrike, *Dryophoneus*, gen. nov. Bull. Brit. Orn. Club, 59: 6, 7.
1939. Birds of Tropical West Africa, 5: 427–431.

BATES, G. L.
1909. Field notes on the birds of Southern Kamerun, West Africa. Ibis, (9) 3: 35.
1930. Handbook of the birds of West Africa: 436–439.

BELCHER, C. F.
1930. The birds of Nyasaland: 272–273.

BENSON, C. W.
1941. Further notes on Nyasaland birds (with particular reference to those of the Northern Province).—Part IV. Ibis, (14) 5: 17, 18.
1945. The races of the rufous-breasted bush-shrike, *Chlorophoneus rubiginosus* (Sund.). Ostrich, 16: 133–138.

BERLIOZ, J.
1935. Ueber *Chlorophoneus nigrithorax*. Orn. Monatsber., 43 (4): 119.
1935. Etude d'une collection d'oiseaux du Congo Belge. Bull. Mus. Paris, (2) 7: 161, 162.
1936. Etude d'une collection d'oiseaux du Congo Belge. Bull. Mus. Paris, (2) 8: 332.

BOULTON, R.
1931. New species and subspecies of African birds. Ann. Carnegie Mus., 21: 56.

FRIEDMANN, H.
1930. The forms of the orange-breasted bush-shrike, *Chlorophoneus sulfureopectus* (Lesson). Occas. Papers Boston Soc. Nat. Hist., 5: 251–253.
1937. Birds collected by the Childs Frick Expedition to Ethiopia and Kenya Colony. U. S. Nat. Mus. Bull. 153, pt. 2: 302–306.

FRIEDMANN, H., AND LOVERIDGE, A.
1937. Notes on the ornithology of Tropical East Africa. Bull. Mus. Comp. Zoöl., 81: 319–322.

GRANT, C. H. B., AND MACKWORTH-PRAED, C. W.
1942. On the colour phases of *Chlorophoneus nigrifrons* (Reichenow). Bull. Brit. Orn. Club, 63: 24–26.
1942. On the status of *Malaconotus poliocephalus* (Lichtenstein) and *Malaconotus hypopyrrhus* Hartlaub. Bull. Brit. Orn. Club, 63: 26–28.

HARTERT, E.
1908. Descriptions of new species of birds from Africa, India, and South America. Bull. Brit. Orn. Club, 23: 9–10.
1923. Description of a new shrike (*Chlorophoneus nigrifrons conceptus*). Bull. Brit. Orn. Club, 43: 79.
1928. Types of birds in the Tring Museum. C. Additional and overlooked types. Nov. Zool., 34: 210–211.

JACKSON, F. J., AND SCLATER, W. L.
1938. The birds of Kenya Colony and the Uganda Protectorate, 3: 1231–1235.

LYNES, H.
1934. Contribution to the ornithology of southern Tanganyika Territory. Birds of the Ubena-Uhehe highlands and Iringa uplands. Journ. f. Orn. 82 (Sonderheft): 107–108.

MOREAU, R. E.
1936. A contribution to the ornithology of Kilimanjaro and Mount Meru. Proc. Zool. Soc. London (1935): 884–885.
1940. Distributional notes on East African birds. Ibis, (14) 4: 462.
1943. A contribution to the ornithology of the east side of Lake Tanganyika. Ibis, 85: 394.

MOREAU, R. E. AND W. M.
1939. A supplementary contribution to the ornithology of Kilimanjaro. Rev. Zool. Bot. Afr., 33: 5, 10.

NEUMANN, O.
1899. Beiträge zu einer Revision der Laniarinen. Journ. f. Orn., 47: 392–398.

REICHENOW, A.
1903. Die Vögel Afrikas, 2: 556–568; Atlas, Pl. 9.

RICHMOND, C. W.
1897. Descriptions of ten new species of birds discovered by Dr. W. L. Abbott in the Kilimanjaro region of East Africa. Auk, 14: 161, 162.

ROBERTS, A.
1914. Notes on birds in the collection of the Transvaal Museum, with descriptions of several new subspecies. . . *Chlorophoneus olivaceus taylori* . . . Ann. Transvaal Mus., 4: 178.
1922. Review of the nomenclature of South African birds. Ann. Transvaal Mus., 8 (4): 247, 248.
1924. Synoptic check list of the birds of South Africa. Ann. Transvaal Mus., 10 (3): 109, 160, 161.
1940. The birds of South Africa: 303–306, Pl. 45, figs. 717–720.

SASSI, M.
1924. Beitrag zur Ornis Zentralafrikas, pt. 3. Ann. Naturhist. Mus. Wien, 38: 24.

SCHOUTEDEN, H.
1914. Liste des oiseaux recueillis à Kilo par M. Thélie. Rev. Zool. Afr., 3: 267–268.

1918. Contribution à la faune ornithologique de la région des lacs de l'Afrique Centrale. Rev. Zool. Afr., 5: 262, 263.
1936. Contribution à la faune ornithologique du nord-est du Congo Belge. Ann. Mus. Congo Belge, C.-Zool., (4) 1 (2): 130.

SCLATER, W. L.
1901. Description of a new species of bush-shrike from the Knysna District of Cape Colony. Ibis, (8) 1: 183, 184, pl. 6.
1930. Systema Avium Aethiopicarum, pt. 2: 624, 631–635.
1931. Description of three new birds from Usambara, Tanganyika Territory. Bull. Brit. Orn. Club, 51: 110.

SCLATER, W. L., AND MOREAU, R. E.
1933. Taxonomic and field notes on some birds of North-Eastern Tanganyika Territory.—Part IV. Ibis, (13) 3: 198–201, Pl. 6.

SOMEREN, V. G. L. VAN
1919. Exhibition and description of new birds from Africa . . . *Chlorophoneus elgeyuensis* . . . Bull. Brit. Orn. Club, 40: 23.
1922. Notes on the birds of East Africa. Nov. Zool., 29: 115.
1932. Birds of Kenya and Uganda, being addenda and corrigenda to my previous paper in "Novitates Zoologicae," XXIX, 1922. Nov. Zool., 37: 305.
1939. Reports on the Corydon Museum Expedition to the Chyulu Hills. Part 2, The birds of the Chyulu Hills. Journ. E. Afr. Ug. Nat. Hist. Soc., 14 (1–2): 103, 104.

STARK, A. C., AND SCLATER, W. L.
1901. The birds of South Africa, 2: 37–39.

STRESEMANN, E.
1924. Mutationsstudien. XI. *Chlorophoneus nigrithorax* (Sharpe). Journ. f. Orn., 72: 87–89.
1926. Uebersicht über die "Mutationsstudien" I–XXIV und ihre wichtigsten Ergebnisse. (Mutationsstudien XXV). Journ. f. Orn., 74: 377–379, Pl. 5, figs. 1, 1 m.
1935. Ueber *Chlorophoneus nigrithorax*. Orn. Monatsber., 43 (3): 95.
1937. Weitere Vogelbälge aus Nord-Angola, gesammelt von Herrn R. Braun. Orn. Monatsber., 45: 52.

SWYNNERTON, C. F. M.
1907. On the birds of Gazaland, Southern Rhodesia. Ibis, (9) 1: 48.
1908. Further notes on the birds of Gazaland. Ibis (9) 2: 57–60.

VINCENT, J.
1935. The birds of northern Portuguese East Africa. Comprising a list of, and observations on, the collections made during the British Museum Expedition of 1931–32.—Part IX. Ibis, (13) 5: 751–757.

ZIMMER, F.
1939. *Chlorophoneus nigrifrons nigrifrons* Rchw. = *Chlorophoneus rubiginosus münzneri* Rchw. Orn. Monatsber., 47: 46–48.

American Museum of Natural History
New York, N. Y.

NOTES ON THE PHYLOGENY OF THE PELECANIFORMES

BY URLESS N. LANHAM

CERTAIN aspects of the phylogeny of the order Pelecaniformes are obscured by the arrangement of its three living suborders in the standard classifications. The sequence as given by Wetmore (1940) and Peters (1931) is: PHAËTHONTES (Tropic-birds), PELECANI (Pelicans, Boobies, Cormorants, Snake-birds), and FREGATAE (Frigate-birds). The tropic-birds and frigate-birds, although widely divergent, show basic structural similarities which indicate both to be primitive members of the order, and which link the order with the Procellariiformes.

The fundamental similarity of *Phaëthon* and *Fregata* has been recognized in the older work on the comparative osteology of the group. Mivart (1878), from a study of the axial skeleton, came to the conclusion that *Phaëthon* and *Fregata* possessed common characters which sharply distinguished them from the other steganopodes, and, in fact, could find no characters to unite them with the rest of the steganopodous genera to form a natural group. The generalized condition of the cervical vertebrae of these two genera, in contrast to the specialization in the rest of the order, and certain primitive skull characters are largely self-evident and may have escaped emphasis for this reason. Shufeldt (1894) states that " . . . Steganopodes are more closely connected with the Tubinares than they are with the Longipennes." Murphy (1936) recognizes the generalized character of the skull of *Phaëthon,* and the affinity of the Pelecaniformes with the Procellariiformes; these two facts, at least, are implicit in modern classifications.

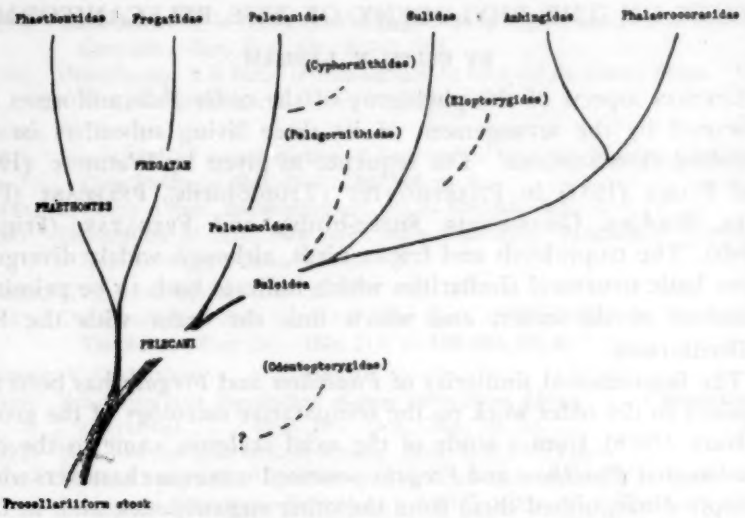
The more obvious skeletal characters common to *Phaëthon* and *Fregata,* and common also to the procellariiforms, may be summarized as follows:

Vomer present; maxillopalatines forming two conspicuous separate lobes on the palatal surface of skull near anterior end of palatines; occipital condyle well underneath skull, so that condyle is anterior to coronal crest. Fifteen cervical vertebrae present; normal, with serial change in shape gradual.

Corresponding characters of the suborder Pelecani are:

Vomer absent; maxillopalatines not visible on palatal surface, or (in *Pelecanus*) visible on surface and lobed, but fused in midline and reduced. Occipital condyle in line with or posterior to the coronal crest. Seventeen to twenty cervical vertebrae; articulation of cervical vertebrae peculiar, eighth or ninth pressed back at pre-axial end; posterior forking of neural arches appearing suddenly on seventh or eighth vertebrae.

The relationship of *Phaëthon* and *Fregata* to each other and to



TEXT-FIGURE 1.—Phylogeny of the Pelecaniformes.

the Procellariiformes is further suggested by the fact that all generally lay a single egg (usually two or more in the Pelecani).

Axial skeleton characters listed by Mivart (1878) as indicating the affinity of *Phaëthon* and *Fregata* include the very large acetabular fossae of these two genera (as compared with the moderate or small fossae in other pelecaniforms), the complete lack of haemal arches on any of the vertebrae (present on some vertebrae in the rest, although incomplete in *Phalacrocorax*), and the shape of the post-acetabular part of the ileum, described as being broad and dorsally convex, arching backwards and downward in a way not found in the rest of the order.

The striking difference in beak structure of the two genera—simple and tern-like in *Phaëthon,* compound and albatross-like in *Fregata*—could be compared to a similar (although less marked) difference in beak structure between the anhingas and cormorants, which are without doubt closely allied. In this view, the beak structure of *Phaëthon* and *Anhinga* would represent independent specializations. Of greater significance are anatomical differences which indicate a long period of separation of *Phaëthon* and *Fregata* stocks. Data on musculature given by Beddard (1898) include: leg musculature *AXY– in Phaëthon* (although Beddard was unable to find the ambiens in this genus, he states that Fürbringer and Gadow mark it as present), *A+* in *Fregata,* biceps slip present in *Phaëthon,* absent in *Fregata.* The sternum of *Phaëthon* has two notches and processes

posteriorly, while that of *Fregata* is truncate. There are also differences in the articulation of the pectoral girdle.

The basic similarities of the Phaëthontes and Fregatae raise the question as to whether or not the two should be merged into a single suborder. Coues (1903) gives the essential facts which justify the separation of the two into separate suborders in stating that the families "Phaëthontidae and Fregatidae differ as much from each other as both do from the other four—Phalacrocoracidae, Anhingidae, Sulidae, and Pelecanidae being more closely related to one another. Such inter-relationships might serve for formal division of the order into three suborders . . ." If the formal classification were to express perfectly the supposed phylogency of the order, as illustrated in the accompanying diagram, then a pair of names of the same grade of category would have to be applied to each branch. *Phaëthon* and *Fregata* taken together would then constitute a taxonomic category equivalent to the rest of the order taken together. An inspection of the diagram will show further that two other grades of categories between suborder and family rank would have to be supplied to express the details of phylogeny. Such a formal classification would not, however, give any direct indication of the relative degrees of difference existing between the families. It would seem better to strike an average between the demands of phylogeny and relative difference by retaining the three suborders (meeting the latter requirement), and by altering the sequence, so that Fregatae follows Phaëthontes (meeting the requirements of phylogeny).

When expressing the phylogeny of a group in the manner of the diagram given here, with the primitive members to the left and the dominant, more evolutionally active members to the right, the degree of morphologic difference between the same grade of category will in a general way decrease from left to right. This is probably the result of longer operation of factors producing divergence, or apparent divergence (extinction of annectant forms), in the more ancient groups.

Although *Phaëthon* and *Fregata* differ widely from the Pelecani, there seems to be little doubt that the three constitute a natural order. Anatomical characters such as the absence of basipterygoid processes (Beddard, 1898: 409, thinks certain processes on the skull of *Pelecanus rufescens* may be rudiments of the basipterygoid processes) and the totipalmate foot are strengthened by other similarities. All (except *Phaëthon*) have similar eggs, and all (except possibly some anhingas) are fish-eaters. Murphy (1936) has pointed out the similarity of the young in all families, and notes that the young *Fregata*

is long-legged. In addition, the fossil *Prophaëthon* seems to be intermediate in some respects between *Phaëthon* and the rest of the steganopodes (Lambrecht, 1933), serving to unify the group.

Pelicans can be regarded as a specialized branch in which the ambiens has been lost, but in which the primitive maxillo-palata structure has been to some extent retained. In the superfamily Sulides, the ambiens muscle is retained (except possibly in some species of cormorants), and the maxillopalatines are not evident parts of the palatal surface. The Sulidae may be differentiated from the cormorants and anhingas by the fusion of the lachrymals to the skull, and (Beddard, 1898: 405) by the presence of 18 cervical vertebrae (20 in the cormorants and anhingas). The Phalacrocoracidae and Anhingidae are the most closely related families of the order. Cormorants are the least specialized of the two. Anhingas have a spear-like beak with serrated margins, and have lost the right carotid artery.

The geographical distribution of the order is that of an ancient group, and perhaps was accomplished, at least as far as continental distribution was concerned, by early Tertiary times. The continental families Pelecanidae and Anhingidae are found on all the major land masses. All families are represented in Australasia. Anhingidae are the most land-bound of the order, and the remaining families, arranged in order of increasingly greater oceanic distribution are (Murphy, 1936) Pelecanidae, Phalacrocoracidae, Fregatidae, Sulidae, and Phaëthontidae. The last are truly pelagic.

Fossil representatives of the Pelecaniformes are fairly numerous, and indicate the group to be an ancient one, being well diversified at the beginning of the Tertiary. The suborder Odontopteryges, from the Eocene, had tooth-like serrations on the margins of the beak; it is generally agreed that they did not posses true teeth. *Odontopteryx,* the type genus, is steganopodous in character, but cannot be referred to any of the living subdivisions of the order. *Pseudodontornis,* of unknown age, also had tooth-like pegs in the beak, and was evidently a large fish-eating bird. It is referred provisionally to the order by Lambrecht (1933). *Prophaëthon,* of Eocene age, is intermediate in many respects between the suborder Phaethontes and the rest of the Pelecaniformes. *Cyphornis* and *Paleochenöides,* from the Miocene of North America, are referred by Wetmore (1928) to a single family, Cyphornithidae, which is most nearly related to the pelicans. *Cyphornis* was a gigantic bird, about twice as large as a modern pelican. Both genera show suloid characters, and are somewhat intermediate between the superfamilies Pelecanoidea and Suloi-

dea. The genera *Pelagornis* (Miocene) and *Argillornis* (Eocene) are placed by Lambrecht in the superfamily Suloidea; they show some relationship to *Sula*. For convenience, both may be put arbitrarily into a single family, Pelagornithidae. The family Elopterygidae contains three genera: *Elopteryx* (Cretaceous), *Eostega* (Eocene), and *Actiornis* (Eocene). They show relationship to both the Sulidae and Phalacrocoracidae. The family may provisionally be considered as an intermediate group. *Miosula*, placed in the Sulidae, is annectant between the gannets and cormorants, as Miller (1925), has pointed out. Fossil cormorants, hardly different from living genera, are found in the Oligocene. *Protoplotus*, from the early Tertiary (probably Eocene), is referred by Lambrecht to the Anhingidae. This early differention of the anhingid stock implies the existence of cormorants in early Tertiary times, since the anhingids were undoubtedly derived from them.

The relationship between the Pelecaniformes and Procellariiformes is of such a nature as to suggest the former to have been derived from a primitive procellariiform stock. It seems likely that the broad lines of phylogenesis were accomplished in Crataceous times.

A hypothetical phylogeny is presented in the accompanying chart. The classification here used may be expressed in tabular form as follows:

ORDER PELECANIFORMES
- SUBORDER PHAËTHONTES
  - FAMILY PHAËTHONTIDAE
- SUBORDER FREGATAE
  - FAMILY FREGATIDAE
- SUBORDER PELECANI
  - SUPERFAMILY PELECANIDES
    - FAMILY PELECANIDAE
    - CYPHORNITHIDAE (extinct)
  - SUPERFAMILY SULIDES
    - FAMILY PELAGORNITHIDAE (extinct)
    - SULIDAE
    - ELOPTERYGIDAE (extinct)
    - ANHINGIDAE
    - PHALACROCORACIDAE
- SUBORDER ODONTOPTERYGES (extinct) (of uncertain position)
  - FAMILY ODONTOPTERYGIDAE
  - PSEUDODONTORNITHIDAE (of uncertain position)

Acknowledgments are due Professor Loye H. Miller, who made available for study the skeletal material at the University of California at Los Angeles, and to Dr. Alexander Wetmore for suggestions made regarding the advisability of retaining sub-ordinal rank for *Phaëthon* and *Fregata*.

LITERATURE CITED

BEDDARD, F. E.
1898. Structure and classification of birds. 548 pp. (London.)
COUES, ELLIOT
1903. Key to North American birds; Fifth edition, 1152 pp. (Boston.)
LAMBRECHT, KALMAN
1933. Handbuch der Palaeornithologie. 1024 pp. (Berlin.)
MILLER, L. H.
1925. Avian remains from the Miocene of Lompoc, California. Carnegie Inst. Wash., 349: 107–117.
MIVART, ST. G.
1878. On the axial skeleton of the Pelecanidae. Trans. Zool. Soc. London, 10: 315–378.
MURPHY, R. C.
1936. Oceanic birds of South America. 1245 pp. (New York.)
PETERS, J. L.
1931. Check list of birds of the world, 1. 345 pp. (Cambridge.)
SHUFELDT, R.
1894. On the affinities of the Steganopodes. Proc. Zool. Soc. London: 160–162.
WETMORE, ALEXANDER
1928. The systematic position of the fossil bird Cyphornis magnus. Bull. Canad. Geol. Survey, 49: 1–4.
1940. A systematic classification for the birds of the world. Smiths. Misc. Coll., 99 (no. 7): 1–11.

Hull Zoological Laboratories
University of Chicago
Chicago, Illinois

VARIATIONS IN COLOR OF THE SHOULDERS OF THE MALE GOLDFINCH

BY HORACE GROSKIN

DURING the six-year period, 1940 to 1946, I banded 1,249 Eastern Goldfinches, *Spinus tristis tristis*, in Ardmore, Montgomery County, Pennsylvania. Forty-two birds (3.36%) returned to Ardmore in the following years. Some returned one year after banding and again a second and third year, while others were not recaptured until two or three years after banding.

When the birds were banded, their wings were measured. The closed-wing measurement, or the chord, was taken of a series of 1,027

birds. The wings were measured in millimeters with dividers, with the length determined from the anterior part of the bend of the wing to the tip of the longest primary, without flattening the curve of the feather. A series of 696 male wings measured 65.5 to 77 mm. (average, 72.1). A series of 331 female wings measured 65 to 73.5 mm. (average 69.5).

Reference to Table I will show that of the 1,249 Goldfinches banded, 1,080 (86%) were captured during the months of March and April, and since at this time of the year the young birds had already passed through their first winter, the sex ratio was checked for any possible indication of a difference in the mortality rate between young males and young females.

TABLE 1

NUMBER OF GOLDFINCHES BANDED

Year	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*Yearly total*
1940	11	9	4	13	8	45
1941	—	48	242	179	—	469
1942	16	57	172	125	—	370
1943	—	—	—	117	4	121
1944	10	2	2	11	—	25
1945	—	—	16	—	—	16
1946	—	4	115	84	—	203
	—	—	—	—	—	—
Total each month	37	120	551	529	12	1,249

Sex determination, with live Goldfinches in the hand, is almost entirely a matter of color of plumage. There is, of course, no difficulty in recognizing the male from the female during the summer months, and it is also not difficult, with the bird in the hand, to identify the young male from the adult male in the winter and early spring months.

As each Goldfinch was banded, sex was determined by the color of the wings and tail, and by the color of the lesser wing-coverts. During late winter and early spring months, the males may also be recognized by black spots or patches on the crown or forehead. Adult female wings and tail are usually brownish or dusky, and the lesser wing-coverts are usually tinged with greenish. The young female, in first winter plumage, usually has the wings and tail brownish, with the white markings tinged with tawny and the lesser wing-coverts brownish. The adult male has wings and tail deep black, with at least some yellow in the lesser wing-coverts, while young males have the wings and tail dull black with the lesser coverts dark-colored. The males may also be distinguished from the females during the

latter part of the winter and the early spring months, as already stated above, by some black feathers or tips of feathers on the crown or forehead; in some individuals I have observed these black spots as early as January. In examining Goldfinch specimens in the collection of the Academy of Natural Sciences of Philadelphia, I found a number of both adult and young male skins with these black spots on the crown, collected, according to the labels on the skins, in the months of November, December, and January. Whether these black feathers on the crown or forehead were old feathers that remained from the previous summer plumage and were not renewed at the postnuptial molt in the fall of the year, or whether they were new feathers indicating the beginning of the spring prenuptial molt, I do not know. However, during the latter part of March and April, the partial prenuptial molt advances rapidly and instead of small black spots on the crown and forehead of the male, sizable black patches appear, and from banded birds that repeated in the traps, I noted that these black patches very soon develop into the full black cap of the male.

A total of 1,080 Goldfinches banded in March and April were determined as to sex. Of this number, 804 (74%) were males and 276 (26%) were females; differential, 2.9 males to 1 female.

Of the males, 303 (38%) were adults and 501 (62%) were young. Of the females, 214 (77%) were adults and 62 (23%) were young.

It is difficult to account for the small number of young females. Young females may not enter banding traps as readily as the young males, or the young females may migrate north in the spring along a different route from that of the adult females, or there may possibly be a higher mortality rate of the young females during their first winter than of the young males during the same period.

While I was banding the Goldfinches, my attention was attracted to the great variation of the colors of the lesser wing-coverts (shoulders) of the young males, and also some variations of the color of the shoulders of the adult males. Notes were made of these variations in 501 young males and 303 adult males, all banded during the spring months of March and April. Notes were also made of the color of the lesser wing-coverts of 27 male Goldfinches that were banded and that returned to Ardmore in the years following banding. As each male was recaptured upon his return, notes were again made of the color of his lesser wing-coverts and these notes were compared with those made when he was originally banded.

The color of the lesser wing-coverts of the young male is usually

referred to as 'brownish.' Forbush (1929; note by C. L. Whittle) states: "Living male first winter plumage has yellowish-brown lesser wing coverts with a marked greenish cast. Such birds in the second winter plumage in life, have the lesser wing coverts bright lemon yellow."

Roberts (1936), referring to the brown shoulder patches of the young male, writes: "A prenuptial molt produces a bright yellow body and a black cap and the first year breeding male is like the adult except the brown shoulder patches, which are not changed to yellow until the postnuptial molt, when old and young are alike."

Dwight (1900), referring to the first winter plumage of the male, writes: "Dull black, brownish or yellowish edged lesser wing coverts (the 'shoulders') distinguish young birds from adults, which have them bright yellow."

In the series of 501 living young males banded at Ardmore, I noted 14 variations of color of the lesser wing-coverts, as listed in Table 2. The reason living young male Goldfinches show greater variation in color in these feathers than is usually found in museum specimens may possibly be due somewhat to fading of the museum specimens. Age of the specimens may account for a certain amount of loss of color which would result in a decreased amount of variation. In recently examining a series of adult male Goldfinch skins, I was rather surprised to find so very few adult males with deep black wings and tails, most of which were blackish-brown, no doubt the result of fading. It is well known, of course, that certain particular colors fade much more rapidly than do others, and some of these, such as the browns, the greens and the yellows, are to be found in the lesser wing-coverts of the male Goldfinches.

Dwight (1902), referring to the variation and fading in the Goldfinch, writes: "The seasonal variation in plumage is considerable, there being no less than six plumages easily recognizable in the male, and although most of the feathers are renewed by moult twice in the year, they are subject to a large amount of fading and actual loss of substance. Seasonal variation is due to moult and subsequent fading of plumage. Probably no colors are more susceptible to fading than the browns and the buffs and therefore the Goldfinch, particularly in the winter dress, varies between wide extremes on the Atlantic Coast, but fades less on the Pacific. Specimens show that *tristis* (Eastern Goldfinch) and *salicamans* (Western Goldfinch) are equally brown after the postnuptial moult, the drier, brighter climate in the east fading *tristis* quite rapidly in the subsequent months, while *salicamans* remains dark."

Another factor that may account for some of the variation in the colors of the lesser wing-coverts of the living young males is a possible molt of these feathers during the prenuptial molt in the spring. Dwight (1902) indicates that some young males renew their lesser wing-coverts at this molt. Writing of the first nuptial male, he states: "The wings and tail are left over from the juvenal stage, while a few tail coverts, abdominal and crural feathers, together with the lesser coverts (sometimes, however, renewed at this moult), remain of the first winter dress." Although Dwight does not say there is some change of color when the lesser wing-coverts are renewed by the young male at the prenuptial molt, yet it is not improbable, since most of the feathers, except the wings and tail, change color at this molt.

About the middle of April, 1946, when I was banding many Goldfinches daily, it occurred to me that it might be worth while to pluck a few of the lesser wing-coverts of the males to see if any of them were new, which might perhaps indicate a prenuptial molt of these coverts. The feathers of 15 birds were secured, 11 young males and four adult males. These feathers, now in my collection, were later examined under a 50-power microscope. The lesser wing-coverts of eight out of the 11 young males contained several new feathers, and three of these eight birds had several bright yellow feathers that could be seen without the aid of a glass.

Under the microscope, new feathers were easily distinguished from old ones, since they showed very slight or no abrasion at the tips of the barbs and no loss of barbules, while the old feathers showed considerable wear and a loss of the tips of the barbs and barbules. In some of the new feathers examined, small particles of the sheath that had crumbled away were still in evidence, lying on other parts of the feather. Since eight of the 11 young males had some new lesser wing-coverts, it may indicate a partial prenuptial molt of these coverts, but not a complete one. However, since only a few feathers were plucked from this area of each bird, the amount of material for study was limited, and, therefore, no definite conclusion could be reached without further investigation.

The feathers plucked from the three remaining young males were all old. Those taken from the four adult males were also old feathers, showing much abrasion of the tips of the barbs and loss of some of the barbules. Also, there appeared to be a certain amount of disintegration of the bright yellow pigment in the barbs, so that the terminal portion of the barbs was very pale yellow, almost approaching white.

It is stated in the literature that the lesser wing-coverts of the adult male Goldfinch are bright lemon or canary yellow. The young male is said to assume these bright yellow shoulders at the postnuptial molt in the fall. By reference to Table 2, it will be noted that the variations of color of the lesser wing-coverts of living adult males were found to include bright canary yellow, dull greenish yellow, and, in a large percentage of the adult males, partly bright canary yellow and partly other colors such as yellowish olive or dull yellowish green. In the 303 living adult males examined, 119 shoulders

TABLE 2

COLOR OF LESSER WING-COVERTS

Number of birds	*%*	*Color*
		501 LIVING YOUNG MALES
91	18.0	Dull yellowish olive
73	14.5	Dull yellowish green
71	14.1	Light yellowish olive-green
43	8.5	Dusky olive-green
37	7.3	Yellowish olive and black
26	5.1	Yellowish green and black
25	4.9	Olive green and black
25	4.9	Brownish and olive-green
24	4.7	Dull greenish yellow and black
25	4.9	Deep olive and black
21	4.1	Brownish olive and black
16	3.1	Dark olive
15	2.9	Brownish and dull yellow
9	1.7	Dark greenish olive
		303 LIVING ADULT MALES
119	39.2	Bright canary yellow
94	31.0	Partly bright yellow and partly other colors
90	29.7	Dull greenish yellow

(39.2%) were bright canary yellow, 94 (31%) were partly bright yellow and partly other colors, and 90 (29.7%) were dull greenish yellow.

Roberts (1936) knew that all adult males did not have complete bright yellow shoulders, since he made the following statement regarding the adult male fall and winter plumage: "The male has blacker wings and tail than the female and more conspicuous white markings, which in the female are buffy. The yellow shoulder patches are retained, in part, at least."

Dwight (1902) also found that the lesser coverts of all the adult males were not bright canary yellow. He states: "In some specimens the lesser wing coverts are greenish tinged, being dusky basally, and there is much white in the median coverts. Such birds usually show

a white spot on the primaries, while the yellow shouldered do not, but whether they represent the second winter plumage and the others the third winter plumage, I cannot say. Osteological characters show that none of these birds are first winter."

It is evident from the above statements that there is a certain amount of variation in the colors of the lesser wing-coverts of adult males as well as of young males. There are also some other factors that should be considered, which may account for the variations. Stone (1896), writing of the assumption of adult plumage, states: "It is, however, quite likely that certain individuals, whether from excessive vitality, or some other cause, assume adult dress at an earlier period in their lives than others, and certain other inividuals never attain the highest development of plumage coloration exhibited by the species."

My investigation appears to confirm this, at least in part.

Table 3 lists banded birds that returned and gives the colors of the lesser wing-coverts at the date of banding and when the birds returned. It will be noted that some of the banded males that returned one or more years after banding did not assume the highest plumage in their lesser wing-coverts even though they had reached their second or third year.

A young male, 41-74527, at least four months old when banded (Jan. 14, 1942), returned 15 months later (Apr. 15, 1943) when at least 19 months old, and still had not acquired the bright canary yellow shoulders of the adult male. Two other young males, 140-47962 and 140-48001, both banded in March, 1941, returned about two years later, one in March and the other in April, 1943, when at least two and a half years old, and they also had not yet assumed the bright canary yellow shoulders of the adult male.

Again referring to Table 3, it will be noted that the two adult males, 40-95345 and 42-36903, with lesser wing-coverts dull greenish yellow at the time of banding, one in April, 1940, and the other in April, 1943, when at least 20 months old, returned one year after banding when they were 32 months old, with these coverts only partly bright canary yellow and not in the height of color of the adult male. Two other adult males, 40-95187 and 40-95346, one banded in February, 1940, and the other April, 1940, when at least 18 to 20 months old, returned about two years later, when approximately three and one-half years old, and still did not have the complete, bright canary yellow shoulders of the adult male; they were only partly bright canary yellow and partly dull-colored.

TABLE 3

27 BANDED MALE GOLDFINCH RETURNS

YOUNG MALES

Band no.	*Date banded*	*Lesser wing-coverts Color at banding*	*Date returned*	*Lesser wing-coverts Color at return*
41-39384	3/30/41	Olive green and black	3/11/42	Bright canary yellow
			12/19/43	Bright canary yellow
40-95216	3/20/40	Light yellowish olive green	3/22/42	Bright canary yellow
140-47975	3/12/41	Dull yellowish olive	3/22/42	Bright canary yellow
41-39335	3/27/41	Yellowish green and black	4/3/42	Bright canary yellow
140-47962	3/12/41	Dull yellowish green	3/9/43	Inner rows of feathers brownish, outer rows dull yellow
140-48001	3/14/41	Olive green and black	4/7/43	Inner rows of feathers yellow olive, outer rows bright canary yellow
			1/9/44	Dull greenish yellow
41-74754	3/14/42	Dull greenish yellow and black	4/8/43	Bright canary yellow
41-74527	1/14/42	Yellowish olive and black	4/15/43	Inner rows light yellowish-olive green, outer row dull greenish yellow.
41-74579	2/15/42	Brownish olive and black	12/19/43	Dull greenish yellow

ADULT MALES

40-95029	1/25/40	Dull greenish yellow	3/1/42	Bright greenish yellow
40-95239	3/10/40	Dull greenish yellow	2/10/41	Bright canary yellow
40-95345	4/28/40	Dull greenish yellow	4/12/41	Inner rows light yellow olive, outer rows bright canary yellow
40-95346	4/28/40	Dull greenish yellow	2/22/42	Inner rows dull greenish yellow, outer rows bright canary yellow
40-95492	2/12/41	Bright canary yellow	3/11/42	Bright canary yellow
40-86570	1/10/40	Dull greenish yellow	3/15/42	Bright canary yellow
			4/10/43	Bright canary yellow
40-95390	5/5/40	Dull greenish yellow	3/28/42	Bright canary yellow
40-95354	4/28/40	Dull greenish yellow	3/28/42	Bright canary yellow
41-56540	4/19/40	Bright canary yellow	4/3/42	Bright canary yellow
			4/14/43	Bright canary yellow
			4/16/44	Bright canary yellow
40-86569	1/10/40	Dull greenish yellow	4/14/42	Bright canary yellow
41-56547	4/26/41	Inner rows dark olive, outer rows bright yellow	4/18/42	Bright canary yellow
			4/17/44	Bright canary yellow
40-95187	2/22/40	Dull greenish yellow	4/18/42	Inner rows light yellowish olive, outer rows bright canary yellow
140-48004	3/14/41	Dull greenish yellow	4/19/42	Bright canary yellow
141-24444	4/17/42	Bright canary yellow	4/7/43	Bright canary yellow
			1/15/44	Bright canary yellow
41-56505	4/13/41	Inner row dull greenish yellow outer rows brownish streaked black	4/8/43	Bright canary yellow
141-24437	4/17/42	Bright canary yellow	4/14/43	Bright canary yellow, also median coverts
41-74633	3/1/42	Bright canary yellow	4/14/43	Bright canary yellow, also median coverts
42-36903	4/7/43	Dull greenish yellow	4/6/44	Inner row dull greenish yellow outer rows bright canary yellow

These facts may account, to some extent, for the greater amount of color variation in the lesser wing-coverts of the living birds than is usually found in museum specimens.

Colors listed in Tables 2 and 3 are, with few exceptions, in accordance with Ridgway's 'Color Standards and Color Nomenclature' (1912).

LITERATURE CITED

DWIGHT, JONATHAN, JR.

1900. The sequence of plumages and moults of the passerine birds of New York. Annals, N. Y. Acad. of Sci., 13: 179.

1902. Individual, seasonal and geographical variations of the American Goldfinch. Auk, 19: 150–158.

FORBUSH, EDWARD HOWE
1929. Birds of Massachusetts and other New England states, 3: 25–26.—Note of C. L. Whittle. (Commonwealth of Massachusetts, Boston.)

ROBERTS, THOMAS S.
1936. Birds of Minnesota, 2: 707–708. (University of Minnesota Press, Minneapolis.)

RIDGWAY, ROBERT
1912. Color standards and color nomenclature. (Press of A. Hoen & Co., Baltimore, Md.)

STONE, WITMER
1896. The molting of birds with special reference to the plumages of the smaller land birds of eastern North America. Proc. Acad. Nat. Sci. Phila.: 110.

Glenn Road
Ardmore
Pennsylvania

BIBLIOGRAPHY OF HAWAIIAN BIRDS SINCE 1890

BY HARVEY I. FISHER

THE war has wrought many changes in the islands of the Pacific Ocean, not the least of which will be its effect on the bird life. Perhaps more naturalists, both professional and amateur, have visited the islands of the Central and Western Pacific in the last four years than in all previous years. Most of these men were in military service, but at the same time they were making observations and collections. Although some of the notes and specimens will probably never be reported, the work done by these individuals may constitute a significant segment of the ornithological research in the Pacific.

Many islands hitherto unknown ornithologically have been visited. Additions to the fauna of other islands have been made. We may expect much clarification of range and taxonomy and the natural history of the various species.

One of the most serious defects of many of the expected publications may well be the absence of any considerable collectanea of literature or specimens. In most cases it has been impossible for any one person to gather specimens from more than a few localities, and in many museums the Pacific is none too well represented by avian specimens suitable for comparative work. Moreover, publications on the Pacific dating from the early exploring expeditions to the present time are scattered in various journals all over the world and will not be available to all who wish to publish their findings.

To these workers bibliographies will be of great aid, and at the same time their publications will be of greater value to other ornithologists if reference is made in them to the literature.

Aside from bibliographies attached to specialized papers there has been little or no attempt to bring together the literature for any island or archipelago in the Pacific. We of the Hawaiian Chain are fortunate in having most, if not all, of the publications on birds up to 1890 collected in the monographs of Rothschild, and Wilson and Evans. Consequently, this present listing includes no papers prior to 1890.

An attempt has been made to annotate very briefly some of the more important and some of the more ambiguous titles. No claim is made that the list is complete; it is not, but part of this is intentional. Popular articles in travel books, magazines and newspapers have, for the most part, been omitted. Likewise, many mimeographed articles are not presented. Although mimeographed, many of the studies in 'The Elepaio,' published by the Honolulu Audubon Society, are included because at present this journal is the only medium of periodical publication within the islands. Articles dealing with migratory birds or birds introduced here are included only if they treat of these birds within the Hawaiian Archipelago, which extends from the island of Hawaii in the southeast to Kure (Ocean) Island in the northwest. Other islands, though under the governmental control of the Territory of Hawaii, are not included.

It is hoped that the 422 titles listed here will be of real value to students of birds in the Pacific, and that any omitted titles will be brought to the attention of the author. Unfortunately, there are 17 titles which I was unable to check.

ALEXANDER, W. B.

1928. Birds of the ocean. A handbook for voyagers. Pp. xxiii + 428, 88 pls. (New York, G. P. Putnam's Sons.)

ALLEN, A. A., ET AL.

1944. Report of the American Ornithologists' Union Committee on Bird Protection for 1943. Auk, 61: 622–635.

ATSATT, R. S.

1945. [Notes on disturbed birds of Midway.] Elepaio, 5: 49–51.

AMADON, DEAN

1942. Relationships of the Hawaiian avifauna. Condor, 44: 280–281.

1944. [Review of] Birds of Hawaii [by Munro]. Auk, 61: 658.

1944. Sanford Ballard Dole: Early Hawaiian ornithologist. Elepaio, 5: 12–13.

1944. The bird collection of the Bishop Museum. Elepaio, 5: 38–40.—Rare specimens and types.

1945. Birds seen on Hawaii. Elepaio, 5: 71–72.

ANONYMOUS

1893. Birds of the Hawaiian Islands. Bernice P. Bishop Mus., Catalog, 4: 5–13.
1901. Game birds. Paradise of the Pacific, 14 (5): 9.
1901. Woodpeckers wanted. Paradise of the Pacific, 14 (11): 19.—To control borers in koa trees.
1901. Mocking-birds. Paradise of the Pacific, 14 (9): 11.
1902. Hawaiian Geese. Paradise of the Pacific, 15 (6): 11.—Breeding in captivity.
1902. Woodpeckers for Hawaii. Paradise of the Pacific, 15 (1): 13.—Recommends Texan, St. Lucas, Nuttall's and Arizona forms.
1904. [Rules and regulations concerning importation of birds into Hawaii.] Hawaiian For. and Agri., 1: 295–297.
1904. A desirable bird. Paradise of the Pacific, 17 (11): 18.—Asks for importation of *Geococcyx* to kill the mongoose.
1904. Protect the Island birds. Paradise of the Pacific, 17 (8): 9.
1905. The sparrow pest. Paradise of the Pacific, 18 (11): 15–16.
1905. Turkeys in Hawaii. Paradise of the Pacific, 18 (3): 20, 1 photo.
1906. Plover's summer food. Paradise of the Pacific, 19 (5): 23.
1907. Domesticating Island quail. Paradise of the Pacific, 20 (4): 18.
1908. Albatross on Laysan Island. Paradise of the Pacific, 21 (11): 15.
1908. Midway Islands. Paradise of the Pacific, 21 (6): 20–21.—Laysan Rails liberated.
1908. Protect the Pheasants. Paradise of the Pacific, 21 (1): 9.
1910. Pieces from the Log of the Thetis. Paradise of the Pacific, 23 (2): 9–12.—References to Leeward Island birds.
1914. The Introduction of Birds. Hawaiian Planters' Record, 11: 309–310.
1915. Lord of the Treasury. Paradise of the Pacific, 28 (3): 19–21.—Feather cloaks in the Bishop Museum.
1922. Birds for Hawaii. The Friend, 91: 225–226.—Three species approved for importation.
1926. Willie Wag-tail introduced. Hawaiian For. and Agri., 23: 3.—*Rhipidura tricolor* from Australia.
1929. To Save the Ne-ne. Hawaiian Almanac and Annual for 1930: 130.
1930. Senator McInerny and birds. The Friend, 100: 74.—His efforts at importation.
1932. The Hawaiian Goose. Hawaiian For. and Agri., 29: 95–96.
1934. Birds of Hawaii (Hui Manu Project). Nature, 133: 289.
1937. Exotic birds of Hawaii. Paradise of the Pacific, 49 (12): 29.
1937. Laysan Island—City and County of Honolulu. Paradise of the Pacific, 49 (9): 20, 31.—General material; plume hunters.
1942. Nomenclature of Brazilian Cardinal. Elepaio, 3: 24.
1945. [Iiwi, picture and notes.] Nat. Hist., 54: 51 and cover.

ANTHONY, A. W.

1900. Nesting habits of the Pacific coast species of the genus *Puffinus*. Auk, 17: 247–252.
1901. Habits of the gooney. Auk, 18: 189.
1924. The raided rookeries of Laysan, a belated echo. Condor, 26: 33–34.

AUDUBON NATIONAL COMMITTEE

1904. [Bird Protection in Hawaii.] Bird-Lore, 6: 142.
1904. [Bird Protection in the Pacific.] Bird-Lore, 7: 68.

BAILEY, A. M.
1919. Notes on our Hawaiian reservation. Jour. Amer. Mus. Nat. Hist., 19: 383–395, many photos.
1934. Wanderers of the Seas: Albatrosses which nest on coral and volcanic rocks in the Pacific Ocean. Nat. Hist., 34: 273–281.
1942. The portulaca flats of Laysan. Audubon Mag., 44: 150–161, 6 pls.

BALDWIN, HELEN S., ET AL.
1938. Christmas census: Hilo, Hawaii. Bird-Lore, 40: 72.
1939. Christmas bird census: Hilo, Hawaii, Bird-Lore, 41 (suppl.): 56.
1940. Christmas census: Hilo, Hawaii and Opaeu Trail, Oahu. Bird-Lore, 42: 136.
1941. Christmas bird census: Hilo, Hawaii and Oahu. Bird-Lore, 43: 148.

BALDWIN, PAUL H.
1940. Environmental relationships of birds in the Kilauea Section, Hawaii National Park. Hawaii Nat'l. Park (mimeogr.), 26 pp.
1941. Checklist of the birds of the Hawaii National Park, Kilauea-Mauna Loa Section, with remarks on their present status and a field key for their identification. Hawaii Nat'l. Park (mimeogr.), 38 pp.
1944. Birds of Hawaii National Park. Audubon Mag., 46: 147–154, 6 figs.—Life histories, migrations, list.
1945. The Hawaiian Goose, its distribution and reduction in numbers. Condor, 47: 27–37, 2 figs., 1 table.

BALL, STANLEY C.
1924. Hawaiian clothing of featherwork. Bernice P. Bishop Mus., Handbook, part 2, pp. 23–31.
1926. Concerning the introduction of foreign birds into the Hawaiian Islands. Abstract *in* Haw. Acad. Sci., Bernice P. Bishop Mus., Spec. Publ., 11: 28–29.

BANGS, OUTRAM
1910. Unrecorded specimens of two rare Hawaiian birds. Proc. Biol. Soc. Wash., 23: 67–69.—*Acrulocercus apicalis* (Gould) and *Ciridops anna* (Dole).
1911. Two new birds from the Island of Molokai. Proc. Biol. Soc. Wash., 24: 29–30.—*Vestiaria coccinea suavis* and *Psittirostra psittacea oppidana*.

BARTSCH, PAUL
1922. A visit to Midway Island (1907). Auk, 39: 481–488.

BELL, E.
1929–1930. Log of the Chatham. Honolulu Mercury, 1 (4): 7–26; 1 (5): 55–69; 1 (6): 76–90; 2 (1): 80–91; 2 (2): 119–129.

BERLEPSCH, HANS VON, AND LEVERKÜHN, PAUL
1890. Studien über einige sudamerikanische Vögel nebst Beschreibungen neuer Arten. Ornis, 6: 1–33, 2 pls.—*Chasiempis sandwichensis*, pp. 2–5.

BERLIOZ, J.
1929. Les charactères de la faune avienne de Polynesie. Oiseau, Paris, 10: 542–551, 581–590.

BLACK, JAMES H.
1901. Sport with gun and dog. Paradise of the Pacific, 14 (7): 16–18.—Importation and hunting of exotics.
1906. Feather hunting at Christmas. Paradise of the Pacific, 19 (12): 20–22.

BLACKMAN, THOMAS M.
1941. Feathered airmen of Midway Islands. Nat. Hist., 48: 173–180.

BLACKMAN, THOMAS M. (*Continued*)
1944. Bird notes from Hawaii. Aviculture, 14: 168–170.
1944. A rare goose. Nat. Hist., 53: 407, 2 figs.
1944. Gliders of Midway. (Honolulu, Tongg Publ. Co.), unpaged.
1944. Birds of the central Pacific Ocean. (Honolulu, Tongg Publ. Co.), 70 pp.
BLOXAM, A.
1925. Diary of Andrew Bloxam. Bernice P. Bishop Mus., Spec. Publ., 10, 96 pp.
BRIGHAM, WILLIAM T.
1897. Splendid Mid-Ocean Museum. Paradise of the Pacific, 10 (9): 129–130.—Bernice P. Bishop Museum.
1899. Hawaiian feather work. Bernice P. Bishop Mus., Memoirs, 1 (1): 1–81.—Birds furnishing feathers, pp. 9–14.
1903. Additional notes on Hawaiian feather work. Bernice P. Bishop Mus., Memoirs, 1 (5): 435–452.
1905. [Henshaw and Menage collections to Bishop Museum.] Bernice P. Bishop Mus., Occ. Papers, 2 (3): 9.
1915. Royal feather robes in Hawaii. Mid-Pacific Mag., 9: 349–351, 2 illus.
1909. The Volcanoes of Kilauea and Mauna Loa. Bernice P. Bishop Mus., Memoirs, 2 (4): 1–222, bound separately.
BROUWER, G. A.
1938. The organization of nature protection in the various countries. Spec. Publ. Amer. Comm. for International Wild Life Protection, number 9.
BRYAN, E. H., JR.
1935. Hawaiian birds. Bernice P. Bishop Mus., Spec. Publ., 26: 5–6.
1935. Hawaiian Nature Notes. (Honolulu, Honolulu Star-Bulletin, Ltd.), pp. 242–264.
1937. Birds of Oahu. Paradise of the Pacific, 49 (1): 22; (2): 24–25; (4): 24; (5): 22, 31; (6): 20.
1938. Ancient Hawaiian life. (Honolulu, Advertiser Publ. Co.), 113 pp., plates.—Use of feathers and causes of extinction.
1939. What were the Guano Islands? Paradise of the Pacific, 51 (9): 5–7; (10): 18–20.
1940. A Summary of Hawaiian birds. Proc. Sixth Pacific Sci. Congress, Berkeley, 4: 185–189.
1940. Bird collection in the Bishop Museum. Elepaio, 1 (3): 1–3, unpaged.
1940. How Hawaiian birds have been collected and studied. 1. The early collectors. Elepaio, 1 (5): 3–4, unpaged.
1940. How Hawaiian birds have been collected and studied. 2. The period of extensive collection. Elepaio, 1 (6): 1–2.
1941. Check list of birds reported from the Hawaiian Group (not including caged birds). Elepaio, 1 (12): 5–6, unpaged; 2 (1): 4–6, unpaged; 2: 12–14, 19–21, 28–30, 37–39, 44–45, 53–54, 59–61, 65–66, 70–71, 75–76, 79.
1942. American Polynesia and the Hawaiian Chain. (Honolulu, Tongg Publ. Co.), 253 pp.
BRYAN, E. H., JR., AND GREENWAY, J. C.
1944. Contribution to the ornithology of the Hawaiian Islands. Bull. Mus. Comp. Zoöl., Harvard, 94: 77–142.—Checklist and general material.
BRYAN, L. W.
1937. Wild pigs in Hawaii. Paradise of the Pacific, 49 (12): 31–32.—Destroy nests of Hawaiian Goose.

BRYAN, W. A., AND SEALE, ALVIN

1901. Notes on the birds of Kauai. Bernice P. Bishop Mus., Occ. Papers, 1 (3): 129–137.

1915. Scientific bird hunting on Kauai. Mid-Pacific Mag., 9: 193–196, 2 illus.—Notes and records.

BRYAN, WILLIAM A.

1901. A key to the birds of the Hawaiian Group. (Honolulu, Bishop Museum Press), pp. 259–332, plates xvi–xxx.

1901. A list of the Hawaiian birds in the St. Louis College Collection, Honolulu, T. H., including records of several North American species. Auk, 18: 382–387.

1902. The Arctic Tern in Hawaii. Auk, 19: 394–395.

1902. Nesting of the Hawaiian Owl (*Asio accipitrinus sandvicensis*) on Oahu, H. I. Auk, 19: 399.

1903. Notes on *Loxioides bailleui* Oust. from Hawaii. Condor, 5: 80.

1903. A monograph of Marcus Island. Bernice P. Bishop Mus., Occ. Papers, 2 (1): 101.

1903. Hawaiian birds in the crater of Kilauea. Condor, 5: 79.

1903. Turnstone taken in the Mid-Pacific. Auk, 20: 210–211.

1903. The Short-eared Owl (*Asio accipitrinus*) taken far out at sea. Auk, 20: 212–213.

1904. Wilson Snipe, *Gallinago delicata* (Ord.), in the Hawaiian Islands. Condor, 6: 78.

1905. Nests and eggs of *Heterorhynchus wilsoni* Roths. Bernice P. Bishop Mus., Occ. Papers, 2 (3): 61–62.

1905. Two undescribed nests and an egg of a Hawaiian bird. Bernice P. Bishop Mus., Occ. Papers, 2 (3): 59–60.

1905. A bird's nest of Pele's hair. Bernice P. Bishop Mus., Occ. Papers, 2 (3): 57–58.

1905. Notes on the American birds collected in the Hawaiian Islands by Mr. Gerrit Wilder. Bernice P. Bishop Mus., Occ. Papers, 2 (3): 53–56.—Sixteen species mentioned.

1905. Descriptions of the nest and eggs of *Chlorodrepanis virens* (Gmel.). Bernice P. Bishop Mus., Occ. Papers, 2 (3): 51–52.

1905. Additional notes on the nesting habits of the Hawaiian Owl. Bernice P. Bishop Mus., Occ. Papers, 2 (3): 49–50.

1905. Notes on the birds of the Waianae Mountains. Bernice P. Bishop Mus., Occ. Papers, 2 (3): 37–49.—Species accounts, especially nesting and plumages.

1906. A report of a visit to Midway Island. Bernice P. Bishop Mus., Occ. Papers, 2 (4): 37–45.

1905. [The Audubon Society in Hawaii.] Bird-Lore, 7: 82.

1906. Nest of the Hawaiian Hawk. Bernice P. Bishop Mus., Occ. Papers, 2 (4): 20–21.

1906. Egg of the Hawaiian Goose. Bernice P. Bishop Mus., Occ. Papers, 2 (4): 21–22.

1908. Some birds of Molokai. Bernice P. Bishop Mus., Occ. Papers, 4 (2): 43–86, 7 illus. and map.

1910. Bird slaughter in the Pacific islands. Bird-Lore, 12: 90–93.

1911. Laysan Island, a visit to Hawaii's bird recservation. Mid-Pacific Mag., 2: 303–315, 7 illus.

BRYAN, WILLIAM A. (*Continued*)

1912. Introduction of birds into Hawaii. Hawaiian Ent. Soc., Proceedings, 2 (4): 169–175.

1912. The introduction and acclimatization of the Yellow Canary on Midway Island. Auk, 29: 339–342.

1914. Hunting the Uau on Molokai. Mid-Pacific Mag., 8: 152–157, 3 illus.

1915. Natural history of Hawaii. (Honolulu, Hawaiian Gazette Co., Ltd.), 596 pp., many illus.

1916. An undescribed species of Drepanididae on Nihoa, Hawaiian Group. Auk, 33: 49–52.

1917. Description of *Telespiza ultima* from Nihoa Island. Auk, 34: 70–72.

BUCK, PETER H.

1944. The local evolution of Hawaiian feather capes and cloaks. Jour. Polynesian Soc., 53: 1–16, 11 illus.

CARTWRIGHT, BRUCE

1929. The legend of Hawaii-loa. Jour. Polynesian Soc., 38: 105–121.—Migration of plover in the Pacific.

CAUM, EDWARD L.

1933. The exotic birds of Hawaii. Bernice P. Bishop Mus., Occ. Papers, 10 (9): 1–55.

1936. Notes on the flora and fauna of Lehua and Kaula islands. Bernice P. Bishop Mus., Occ. Papers, 11 (21): 1–17.

CHISHOLM, DONALD R.

1937. The majestic albatross. Asia, 37: 84–89.

CLARK, A. H.

1911. The birds collected and observed during the cruise of the U. S. Fisheries Steamer "Albatross" in the North Pacific Ocean, and in the Bering, Okhotsk, Japan and Eastern seas, from Apr. to Dec., 1906. Proc. U. S. Nat. Mus., 38: 25–74.

CLARK, BYRON O.

1904. [Importance of insectivorous birds.] Hawaiian For. and Agri., 1 (3): 53–54.—Advises introduction of insectivorous birds.

CLARK, HUBERT L.

1912. Notes on the Laysan Finch. Auk, 29: 166–168.—Morphological, comparison with Gadow's work.

COGSWELL, H. L.

1945. Recent birding on Oahu yields interesting records. Elepaio, 5: 52–54.

COUZENS, H. D.

1919. Duck shooting in a crater. Mid-Pacific Mag., 18: 327–330.—Abundance in Diamond Head, Oahu.

DELACOUR, JEAN

1928. Les oiseaux des Iles Hawaii. Oiseaux, Paris, 9: 1–30.

1936. Note sur la classification des Anatides. L'Oiseau et Rev. Franc. d'Orn. 6: 366–379.—*Anas wyvilliana* and *laysanensis*, p. 367.

DELACOUR, JEAN, AND MAYR, ERNST

1945. The Family Anatidae. Wilson Bull., 57: 3–55, 24 figs.—*Nesochen* is *Branta*, *wyvilliana* and *laysanensis* are *platyrhynchos*.

DENIG, J. L.

1936. A marine among the birds [Midway I.]. Bird-Lore, 38: 5–11, photos.

DICKEY, DONALD R.
1925. Bird life among lava rock and coral sand. Nat. Geog. Mag., Washington, 1925: 87–102.—All photographs.
DILL, HOMER R., AND BRYAN, W. A.
1912. Report on conditions on Laysan, with recommendations for protecting the Hawaiian Islands Reservation. U. S. Dept. Agri., Biol. Survey Bull., 42, 30 pp., 9 pls. and 1 fig.—Species accounts and census.
DILL, HOMER R.
1913. The albatrosses of Laysan. Jour. Amer. Mus., 13: 185–192, photos.
1916. The albatross of Laysan. Wilson Bull., 28: 172–175, many photos.
1916. The mating and nesting habits of *Fregata aquila*. Wilson Bull., 28: 153–157, many photos.
DONAGHHO, W. R.
1940. A list of birds noted on the Island of Hawaii in May 1940. Elepaio, 1 (4): 3–4, unpaged.
1941. [Letter from Midway.] Elepaio, 2: 33.—Notes and records.
1941. A report of ornithological observations made on Kauai. Elepaio, 2: 52.
DOUGHERTY, HENRY E.
1935. The cruise of the Itasca. Paradise of the Pacific, 47 (3): 21–25.—Bird notes from Leeward Islands.
DUPUY, W. A.
1936. Now the Nene. Nat. Mag., 27: 17–18, 2 photos.—Decline in numbers.
DUTCHER, WILLIAM
1905. [Bird protection in the Pacific.] Bird-Lore, 7: 301–306.
1907. [Bird protection in the Pacific.] Bird-Lore, 9: 58–59.
DWIGHT, JONATHAN
1901. The sequence of moults and plumages of the Laridae (Gulls and Terns). Auk, 18: 49–63.
EHRHORN, E. M.
1925. Bird introductions (*Grallina picata*) into Hawaii. Rept. Bd. Agri. and For. of Hawaii for 1924, pp. 42–43, 1 pl.
ELLIS, W.
1917. Narrative of a tour through Hawaii. (Honolulu, Hawaiian Gazette Co., Ltd.), 367 pp. (reprint of the London edition, 1827).
EMERSON, N. B.
1894. The bird-hunters of ancient Hawaii. Hawaiian Almanac and Annual for 1895, pp. 101–111.
EMERSON, O. P.
1928. Pioneer days in Hawaii. (New York, Doubleday), p. 96.
FALLA, R. A.
1942. Review of the smaller Pacific forms of *Pterodroma* and *Cookilaria*. Emu, 42: 111–118.
FINSCH, O.
1898. [*Pennula wilsoni*.] Leyden Museum Notes, 20: 77–80.
FISHER, H. I.
1945. Black-footed Albatrosses eating flying fish. Condor, 47: 128–129.
1945. Oahu's offshore islets as bird refuges. Elepaio, 6: 29–32.
FISHER, H. I., AND BALDWIN, P. H.
1945. A recent trip to Midway Islands, Pacific Ocean. Elepaio, 6: 11–13.
1946. War and the birds of Midway. Paradise of the Pacific, 58 (1): 4–9, 7 figs., 1 table.

FISHER, W. K.

1903. A new *Procelsterna* from the Leeward Islands, Hawaiian Group. Proc. U. S. Nat. Mus., 26: 559–563.—*Procelsterna saxatilis*, n. sp., from Necker Island.

1903. Notes on the birds peculiar to Laysan Island, Hawaiian Group. Auk, 20: 384–397, plates 12–16.

1904. On the habits of the Laysan Albatross. Auk, 21: 8–20, plates 2–7.

1904. Three Boobies interviewed. Condor, 6: 89–94, 7 illus.—Nesting and feeding of young.

1904. The home life of a buccaneer. Condor, 6: 58–61.—*Fregata aquila* on Laysan.

1904. The albatross dance at sea. Condor, 6: 78.

1906. Birds of Laysan and the Leeward Islands, Hawaiian Group. Bull. U. S. Fish Comm., no. 23, 39 pp. and 10 pls.

FOSTER, G. S.

1944. Some notes on the birds of Hawaii. Bull. Aud. Soc. New Hampshire, 15: 136–138.

FROHAWK, F. W.

1892. Description of a new species of rail from Laysan Island (North Pacific). Ann. and Mag. Nat. Hist., (ser. 6) 9: 247–249.—*Porzanula palmeri*.

GADOW, H.

1899. Remarks on the structure of certain Hawaiian birds, with reference to their systematic position. *In* Wilson and Evans, Aves Hawaiienses, (London, R. H. Porter), 28 pp., 3 pls.

GALTSOFF, P. S.

1933. Pearl and Hermes Reef, Hawaii, hydrographical and biological observations. Bernice P. Bishop Mus., Bull. 107: 1–49, 5 pls., 9 charts and figs.

GERMAIN, LOUIS

1928. L'origine et l'evolution de la faune de Hawaii. Proc. Third Pan-Pacific Sci. Congress, Tokyo, 1: 973–1011.

GODMAN, F. DU CANE

1907–1910. A monograph of the petrels (Order Tubinares). (London, Witherby and Co.), 381 pp., 103 col. pls.

GREEN, THOMAS H.

1942. Destruction of bird life on Rabbit Island. Elepaio, 3: 16–17.—Island used as practice artillery target.

GREENWAY, JAMES C.

1939. *Dysmorodrepanis munroi* probably not a valid form. Auk, 56: 479–480.

GRISCOM, LUDLOW

1916. The Arctic Tern in central New York, Auk, 33: 319.—Notes records in Hawaii of 1891 and 1902.

GRINNELL, J.

1911. The Linnet of the Hawaiian Islands: A problem in speciation. Univ. Calif. Publ. Zool., 7: 179–195.

1912. A name for the Hawaiian Linnet. Auk, 29: 24–25. (*Carpodacus mutans* n. sp.)

1912. Concerning the Hawaiian Linnet. Auk, 29: 543.

1932. Type localities of birds described from California. Univ. Calif. Publ. Zool., 38: 243–324.—Type of *Buteo solitarius* supposedly taken in California.

GRINNELL, J., AND MILLER, A. H.
1945. The distribution of the birds of California. Pacific Coast Avifauna, no. 27, p. 561.

GROSS, ALFRED O.
1923. The Black-crowned Night Heron (*Nycticorax nycticorax naevius*) of Sandy Neck. Auk, 40: 191–214, pls. 5–14.—Comparison with Honolulu specimens.

GUBERLET, J. E.
1926. Notes on the parasitic fauna of Hawaii. Bernice P. Bishop Mus., Spec. Publ., 11: 29–30.—Parasites of birds.

GURNEY, JOHN H.
1891. Notes on *Buteo* (*Onychotes*) *solitarius*. Ibis, 1891: 21–24.

HACHISUKA, M. U.
1928. Ornithological recollections from Hawaii. Tori, Tokyo, 5: 496–499.—In Japanese.
1928. Variations among birds (chiefly game birds). Ornith. Soc. Japan, Suppl. Publ. 12, 85 pp., 24 pls.—Hybrid Hawaiian Goose.

HADDEN, FRED C.
1941. Midway Islands. Hawaiian Planters' Record, 45: 179–221, illus.—Running accounts of birds.

HALL, L. A.
1938. Hawaiian bird notes. Oologist, 55: 101–102.
1940. Report on the Hawaiian Owl. Oologist, 57: 54–55.

HARTERT, ERNST
1919. Types of birds in the Tring Museum. B. Types in the general collection. I. Corvidae to Meliphagidae. Novitates Zool., 26: 123–178.
1926. Types of birds in the Tring Museum. B. Types in the general collection. VII. Tubinares. Novitates Zool., 33: 344–357.
1927. Types of birds in the Tring Museum. B. Types in the general collection. VIII. Novitates Zool., 34: 1–38.

HARTLAUB, G.
1893. Vier seltene Rallen. Abhdl. d. Naturw., Bremen, 12: 389–402.—Two Hawaiian rails included.
1895. Beitrag z. Geschichte der ausgestorben Vögel der Neuzeit, sowie derjenigen deren Fortbestehen bedroht erscheint. Abhdl. d. Naturw., Bremen, 14: 1–58.

HATCH, GRENVILLE
1940. The Audubon Society has a night out. Elepaio, 1 (6): 3–5.—Rabbit Island off the coast of Oahu.

HEENAN, DAVID, JR.
1922. The birds of Midway Island. Mid-Pacific Mag., 24: 247–249.

HENNING, C. L.
1912. Der Untergang des Albatros auf Laysan Island, Hawaiische Inseln. Naturw. Wochenschrift, Jena, 27: 729–730.

HENNINGER, J.
1912. Ein Beitrag zur geographischen Verbreitung der beiden pazifischen *Numenius*-Arten. Ornith. Monatsber., 20: 62–64.

HENSHAW, H. W.
1900. Occurrence of *Larus glaucescens* and other American birds in Hawaii. Auk, 17: 201–206.

HENSHAW, H. W. (*Continued*)
1900. Description of a new shearwater from the Hawaiian Islands. Auk, 17: 246–247.—*Puffinus newelli*, from Maui.
1901. First impressions of Hawaiian birds. Bird-Lore, 3: 119–125, 153–159.
1901. On the habits and haunts of the Noio or Hawaiian Noddy Tern. Ibis, 1901: 196–200.
1901. Occurrence of *Tringa maculata* and other American birds in Hawaii. Auk, 18: 202.
1901. The Yellow-billed Tropic Bird in the Hawaiian Islands. Auk, 18: 105.
1901. Introduction of foreign birds into the Hawaiian Islands with notes on some of the introduced species. Hawaiian Almanac and Annual, 1901: 132–142.
1902. Birds of prey as ocean waifs. Auk, 18: 162–165.
1902. On the various plumages of *Buteo solitarius*. Ibis, 1902: 386–392.
1902. The Elepaio of Hawaii. Auk, 19: 225–232.—Descriptions, distribution and natural history.
1902. Belted Kingfisher in the Island of Hawaii. Auk, 19: 199.
1902. *Buteo solitarius* off the coast of Hawaii. Auk, 19: 197–198.
1902. Occurrence of the Arctic Tern (*Sterna paradisaea*) in the Hawaiian Islands. Auk, 19: 195.
1902. Birds of the Hawaiian Islands being a complete list of the birds of the Hawaiian possessions with notes on their habits. (Honolulu, Thos. G. Thrum), 146 pp.
1903. Occurrence of the Emperor Goose in Hawaii. Auk, 20: 164–167.
1904. [Letter to American Ornithologists' Union.] Auk, 21: 134–137.
1910. Migration of the Pacific Plover to and from the Hawaiian Islands. Auk, 27: 245–262.
1911. Report of the Committee on the Introduction of Birds into the Hawaiian Islands. Hawaiian For. and Agri., 8: 61–64.
1912. Our mid-Pacific bird reservation. U. S. Dept. of Agri., Yearbook for 1911, pp. 155–164, 2 figs., 2 pls.
1916. [Review of] Bryan's Natural History of Hawaii. Auk, 33: 207–209.
1918. A mid-Pacific bird reservation. Mid-Pacific Mag., 15: 282–285, 3 illus.
1920. Autobiographical notes. Condor, 22: 95–101.

HILL, MAURICE
1939. Mynah birds. Paradise of the Pacific, 51 (9): 19–20.

HORNADAY, WILLIAM T.
1913. Our vanishing wild life. Its extermination and preservation. (New York, Charles Scribner's Sons), 411 pp., maps and illustrations.

HUDSON, OLAF
1911. Uncle Sam's ocean park. Mid-Pacific Mag., 1: 339–343, 4 illus.—Hawaiian Reservation.

ISENBERG, A. H.
1931. Transplanting foreign birds to the Hawaiian Islands, and other notes. Aviculture, 3: 333–334.
1932. Exotic birds not detrimental to native birds in the Hawaiian Islands. Aviculture, 4: 70–71.

JAGGAR, T. A.
1915. [White-tailed Tropic Bird.] Weekly Bull. Hawaiian Volcano Observ., 3 (9): 96.

JUDD, CHARLES S.
1923. Glimpses of our sea birds to the westward. **Paradise of the Pacific, 36** (12): 85–87.
1924. Rules for pheasant shooting in Kula Forest Reserve. **Hawaiian For. and** Agri., 21: 142–143.
KELLY, H. L.
1928. Pheasant culture at the Territorial game farm. **Hawaiian For. and Agri.,** 25: 71–79.
KNOWLTON, FRANK H.
1909. Birds of the world. (New York, Henry Holt and Co.), xiii, 873 pp.
KOCH, NORMA
1937. Hawaii's early treatment of birds. **Audubon Yearbook, Indiana Aud.** Soc., 15: 28–32.
LAING, HAMILTON M.
1925. Birds collected and observed during the cruise of the Thiepval in the North Pacific, 1924. Victoria Memorial Mus., Bull. 40, 46 pp., 3 pls.—Includes Hawaiian forms.
LAMB, S. H.
1937. The Nene living in a natural state. **Paradise of the Pacific, 49 (9): 15, 30.**
LANGTON, ELINOR A.
1911. A Hawaiian bill of fare. Paradise of the Pacific, 24 (12): 32–34.
LA'TOUCHE, J. D.
1923. Notes sur quelques oiseaux de l'Ocean Pacifique. **Rev. Franç. d'Orn., 8:** 215–218.
LEVY, SEYMOUR
1944. Some birds of Kauai. Bull. Illinois Aud. Soc., 52: 14–16.
LOCEY, F. H.
1937. Introduced game birds of Hawaii. **Paradise of the Pacific, 49 (1): 5, 6,** 27–30.
LÖNNBERG, E.
1908. Nagra ord om Sandwichsöarnes fägelvärld. [Birds of the Sandwich Islands.] Fauna och Flora, Upsala, 3: 43–48.
LOOMIS, LEVERETT M.
1918. Expedition of the California Academy of Sciences to the Galapagos Islands, 1905–1906. XII. A Review of the albatrosses, petrels, and diving petrels. Proc. Calif. Acad. Sci., 2: 1–187, pls. 1–17.
LOWREY, VERNON
1933. A strange tropic bird in Kilauea Crater. **Mid-Pacific Mag., 45: 343–344.**
LOW, G. C.
1931. The literature of the Charadriiformes from 1894–1928. Second edition. (London, H. F. and G. Witherby), xiii, 637 pp.
LUCAS, F. A.
1894. Notes on the anatomy and affinities of the Coerebidae and other American birds. Proc. U. S. Nat. Mus., 17: 299–312, 13 figs.—Comparisons with drepanids.
LYONS, A. B.
1890. In bird land. Part of the journal of a visit to Laysan Island. **The Friend,** 1890: 90–91.
MACKAYE, ARTHUR L.
1915. Marooned on a bird island. Mid-Pacific Mag., 9: 35–39.—Moku Manu, off Oahu.

MACCAUGHEY, VAUGHN

1919. The Hawaiian Elepaio. Auk, 36: 22–35.—Description and natural history.

MATHEWS, G. M.

1914. On the species and subspecies of the genus *Fregata*. Austral Avian Record, 2: 117–121.

1925. [Nomenclatural notes.] Bull. Brit. Ornith. Club, 45: 93.

1929. Notes on Vol. VIII of the 'United States Exploring Expedition,' by Titian R. Peale, published in 1848. Ibis, 5: 690–700.—Synonymy of various names proposed by Peale.

1927–1930. Systema Avium Australasianarum. A systematic list of the birds of the Australasian Region. (London, Brit. Ornith. Union), Vols. 1 and 2, 1047 pp.

MAYR, ERNST

1933. Die Vogelwelt Polynesiens. Mitteilungen Zool. Mus., Berlin, 19: 306–323.

1939. Borders and subdivisions of the Polynesian Region based on our knowledge of the distribution of birds. Proc. Sixth Pacific Sci. Congress, 4: 191–195.

1939. The origin and the history of the bird fauna of Polynesia. Proc. Sixth Pacific Sci. Congress, 4: 197–216.

1943. The zoogeographic position of the Hawaiian Islands. Condor, 45: 45–48.

1945. Birds of the southwest Pacific. A field guide to the birds of the area between Samoa, New Caledonia, and Micronesia. (New York, Macmillan Co.), xix, 316 pp., 3 pls., 16 figs.

1945. *Bird conservation problems* in the southwest Pacific. Audubon Mag., Sept.–Oct., 1945, 1 fig.

MCATEE, W. L.

1925. Introduction upon introduction. Auk, 42: 160.

MCGREGOR, R. C.

1901. Dichromatism in the genus *Carpodacus*. Condor, 3: 13–14.

1901. [Color changes with age in *Vestiaria coccinea*.] Condor, 3: 14.

1902. Notes on a small collection of birds from the Island of Maui, Hawaii. Condor, 4: 59–62.

MEARNS, E. A.

1909. A list of birds collected by Dr. Paul Bartsch in the Philippine Islands, Borneo, Guam, and Midway Island, with descriptions of three forms. Proc. U. S. Nat. Mus., 36: 463–478.

MEISE, VON W.

1938. Fortschritte der Ornithologischen Systematik seit 1920. Proc. Eighth Internat. Ornith. Congress, Oxford, July, 1934, pp. 49–189.—*Sassius, Magumma*.

MERRILL, C. F.

1917. Feathered migrants. Mid-Pacific Mag., 14: 227–279, illus.

MILLER, ALDEN H.

1937. Structural modifications in the Hawaiian Goose (*Nesochen sandvicensis*). A study in adaptive evolution. Univ. Calif. Publ. Zool., 42: 1–80, pls. 1–6, 12 text figs.

MILLER, LOYE

1930. The Asiatic Mynah in Los Angeles, California. Condor, 32: 302. Bad effects of introduction into Hawaii.

MUNRO, G. C.
1895. Hawaiian birds. Paradise of the Pacific, 8 (4): 49–50.
1927. Hawaiian birdlife. Bernice P. Bishop Mus., Spec. Publ., 12: 12–14.
1927. What we know of bird life in Hawaii. Hawaiian For. and Agri., 24: 117–121.
1928. [Ornithological report] *in* Report of Director of Bishop Museum for 1927. Bernice P. Bishop Mus., Bull. 57: 19.
1930. Myriad-nested Laysan. Asia, 1930: 486–489.
1939. Preservation of our shore waterfowl and waders. Bernice P. Bishop Mus., Spec. Publ., 33: 8.
1940. [Report on Niihau observations]. Elepaio, 1 (1): 3–4, unpaged.
1940. A vanishing bird. Elepaio, 1 (4): 1–2, unpaged.—*Psittacirostra psittacea.*
1940. Birds of Hawaii and adventures in bird study. Elepaio, 1 (5): 1–2, unpaged; 1 (7): 1–3.
1940. Birds of Hawaii. The Wedge-tailed Shearwater. Elepaio, 1 (8): 1–4.
1941. Report of the Bernice P. Bishop Museum for 1940. Bernice P. Bishop Mus., Bull. 171: 17–18.—Bird banding in the islands.
1941. Birds of Hawaii and adventures in bird study. Bird islands off the coast of Oahu. Elepaio, 1 (9): 1–4.
1941. Birds of Hawaii and adventures in bird study. The White or Love Tern. Elepaio, 1 (10): 1–5.
1941. Birds of Hawaii and adventures in bird study. The Noddy in Hawaii. Elepaio, 1 (12): 1–4.
1941. Birds of Hawaii. The Elepaio. Elepaio, 1 (12): front.
1941. Birds of Hawaii. Elepaio, 2: front.
1941. Birds of Hawaii and adventures in bird study. Bulwer's Petrel. Elepaio, 2: 1–3.
1941. Birds of Hawaii and adventures in bird study. The Ao, Newell's Puffin. Elepaio, 2: 9–11.
1941. Birds of Hawaii and adventures in bird study. The Christmas Island Shearwater. Elepaio, 2: 16–18.
1941. Birds of Hawaii. *Rhodacanthis palmeri.* Elepaio, 2: 22.
1941. Birds of Hawaii and adventures in bird study. The Dark-rumped Petrel. Elepaio, 2: 24–27.
1941. Birds of Hawaii. *Chloridops kona.* Elepaio, 2: 31.
1941. Birds of Hawaii and adventures in bird study. An ocean cruise. Elepaio, 2: 41–43, 49–51, 56–58, 63–64, 67–68, 72–73, 77–78; 3: 2–3, 5–6, 7–8, 12–13, 15–16, 18–19, 22–23, 26–27.—Rothschild expedition to Leeward Islands.
1941. Birds of Hawaii. Parrot-billed Koa Finch. Elepaio, 2: 47–48.
1943. The Indian Mynah (*Acridotheres tristis*) in Hawaii. Elepaio, 3: 29–31.
1943. Birds of Hawaii and adventures in bird study. Behaviour of birds when protected. Elepaio, 3: 34–35, 37–38.
1943. Birds of Hawaii and adventures in bird study. Value of birds to man. Elepaio, 3: 42–43; 4: 3–4.—Plover, Turnstone and Mynah.
1943. Birds of Hawaii and adventures in bird study. The Alae Awi. Elepaio, 4: 5–6.—*Porphyrio poliocephalus melanotus.*
1943. Birds of Hawaii and adventures in bird study. Some breeding and feeding habits of sea birds. Elepaio, 4: 17–18, 23–25.
1944. Birds of Hawaii and adventures in bird study. A visit to Moku Manu. Elepaio, 4: 29–30.

MUNRO, G. C. (*Continued*)
1944. Birds of Hawaii and adventures in bird study. Notes of migrations and straggling birds. Elepaio, 4: 33–34, 37–38, 41–43.
1944. Adventures in bird study. Collecting specimens of birds. Elepaio, 4: 45–46, 51–52.
1944. Mr. and Mrs. Morrison of Midway Island. Elepaio, 4: 52.
1944. Strange action of a Kentucky Cardinal. Elepaio, 5: 3.
1944. Birds of Hawaii. (Honolulu, Tongg Publ. Co.), 189 pp., 20 colored pls. and 19 photos.
1945. Bird banding in Hawaii. Elepaio, 5: 43–45, 56–60.
1945. Tragedy in bird life. Elepaio, 5: 48–49.
1945. Protection for Hawaiian shore birds. Elepaio, 5: 63–65, 72–75.
1945. The Laysan Albatross on Kauai. Elepaio, 5: 69.
1945. Endangered bird species of Hawaii. Elepaio, 5: 76–79; 6: 1–6.

MURPHY, R. C.
1938. The need of insular exploration as illustrated by birds. Science, 88: 533–539, 2 figs., 2 tables.

NEFF, E. O.
1945. Mr. Wise Guy—the Indian Mynah. Nat. Mag., 38: 13–14.

NELSON, E. W.
1921. Suggestions for biological work in the Pacific. Bernice P. Bishop Mus., Spec. Publ., 7: 265–276.
1922. The land fauna of islands in the Pacific. Mid-Pacific Mag., 23: 233–240, illus.

NEWTON, A.
1892. Ornithology of the Sandwich Isles. Nature, 45: 465–469.
1893. On a new species of *Drepanis* discovered by Mr. R. C. L. Perkins. Proc. Zool. Soc., London, 1893: 690.—*Drepanis funerea* from Molokai.
1897. On some new or rare birds' eggs. Proc. Zool. Soc., London, 1897: 890–894.

NICHOLS, JOHN T.
1914. An undescribed Galapagos race of *Oceanodroma castro*. Auk, 31: 388–390.—Comparison with *O. c. cryptoleucura* in Hawaii.

NORTHWOOD, J. D'ARCY
1937. Notes on Hawaiian bird life. Bird Notes and News, London, 17: 152–153.
1940. Familiar Hawaiian birds. (Honolulu, Thomas Nickerson), 63 pp., 11 pls.
1940. A night on a bird island. Bird-Lore, 42: 33–36, 2 figs.
1940. The Elepaio. Elepaio, 1 (2): 1–2, unpaged.
1940. Bird-walk at Kahuku. Elepaio, 1 (3): 3–5, unpaged.
1941. Identification key to familiar Hawaiian birds. Elepaio, 1 (13): 1–8.—Structure, calls, flight, habitat.
1942. Cardinals. Elepaio, 3: 9–10.
1942. Birds in Hawaii. Hawaiian Almanac and Annual, 1942: 120–123.
1942. The White-eye. Elepaio, 3: 13–14.
1942. Give a dog a bad name. Elepaio, 3: 20–21.—Effect of Mynah on native birds.
1943. Hawaiian Hawk. Elepaio, 4: 6–7.—Evidence that it feeds on small birds.
1943. Cottage at Kokee. Elepaio, 4: 12–13.—Random bird notes.
1944. Sea birds catching fish. Elepaio, 4: 48–49.—Methods of holding several in bill.

NUTTING, CHARLES C.
1903. Bird rookeries on the islands of Laysan. Popular Sci. Monthly, 63: 321–332.

OBERHOLSER, HARRY C.
1917. Notes on the genus *Puffinus* Brisson. Auk, 34: 471–475.
1917. Description of a new genus of Anatidae. Proc. Biol. Soc., Wash., 30: 119–120.—Laysan Teal is *Horizonetta laysanensis*.
1918. *Larus nelsoni*, in juvenal plumage, from the Hawaiian Islands. Auk, 35: 349–350.

OGILVIE-GRANT, W. R.
1898. [Species of *Sula*.] Cat. Birds Brit. Mus., 26: 423–441.
1898. [*Fregata aquila*.] Cat. Birds Brit. Mus., 26: 443–447.
1898. [*Phaëthon rubricauda* and *P. lepturus*.] Cat. Birds Brit. Mus., 26: 451–455.

OLSEN, E.
1918. The Midway tragedy. Mid-Pacific Mag., 15: 77–81, 4 illus.—Shipwrecked men lived on albatross eggs.

PALMER, T. S.
1898. The danger of introducing noxious animals and birds. U. S. Dept. Agri. Yearbook for 1898: 87–110.
1913. Our national bird reservations. Jour. Amer. Mus., 13: 203–214.

PEPPIN, HAZEL
1943. Exotic birds of Hawaii. Elepaio, 4: 25–26.

PERKINS, R. C. L.
1893. Notes on collecting in Kona, Hawaii. Ibis, 1893: 101–112.—Natural history and distribution.
1895. Notes on some Hawaiian birds. Ibis, 1895: 117–129.—Habits, structure, and distribution of some drepanids.
1901. An introduction to the study of the Drepanididae, a family of birds peculiar to the Hawaiian Islands. Ibis, 1901: 562–585.—Critical, morphology and natural history.
1903. Vertebrata. *In* Fauna Hawaiiensis (Cambridge, University Press), vol. 1, pp. 368–465.
1919. On a new genus and species of birds of the family Drepanididae from the Hawaiian Islands. Ann. Mag. Nat. Hist., ser. 9, 3: 250–252.—Description of *Dysmorodrepanis munroi*.

PETERS, J. L.
1931. Checklist of birds of the world. (Cambridge, Harvard Univ. Press), 5 vols.
1938. Laysan Albatross on San Nicholas Island, California. Condor, 40: 90.

PHILLIPS, JOHN C.
1912. The Hawaiian Linnet, *Carpodacus mutans* Grinnell. Auk, 29: 336–338.
1912. A reconsideration of the American Black Ducks with special reference to certain variations. Auk, 29: 295–306, pl. 15.—*Anas wyvilliana*, pp. 301–304.
1915. Notes on American and Old World English Sparrows. Auk, 32: 51–59.
1916. Two problems in the migration of water fowl. Auk, 33: 22–27.—In Marshall and Hawaiian Islands.
1923. A natural history of the ducks. (Boston, Houghton Mifflin), vol. 2: 44–52, pl. 21.
1928. Wild birds introduced or transplanted in North America. U. S. Dept. Agri., Tech. Bull. 61.

POPE, W. T.

1918. Dr. William Hillebrand, M.D., 1921–1886. Hawaiian Almanac and Annual for 1919: 53–60.—His importations of birds.

1932. The Hawaiian Goose or Nene. Hawaiian Almanac and Annual for 1933: 107–112.

REICHENOW, A.

1913–1914. Die Vögel: Handbuch der systematischen Ornithologie. (Stuttgart, Ferdinand Enke), 2 vols., pp. 1–529, 1–628.—Drepanididae.

RICHARDS, T. W.

1909. Nesting of *Diomedea nigripes* and *D. immutabilis* on Midway Islands. Condor, 11: 122–123.

RICHMOND, C. W.

1901. List of generic terms proposed for birds during the years 1890 to 1900, inclusive, to which are added names omitted by Waterhouse in his "Index Generum Avium." Proc. U. S. Nat. Mus., 24: 663–729.

1909. Generic names applied to birds during the years 1901 to 1905, inclusive, with further additions to Waterhouse's "Index Generum Avium." Proc. U. S. Nat. Mus., 35: 583–655.

ROTHSCHILD, WALTER

1892. [Description of *Anas laysanensis*.] Bull. Brit. Ornith. Club, 1: 17.

1892. Descriptions of seven new species of birds from the Sandwich Islands. Ann. Mag. Nat. Hist., (ser. 6) 10: 108–112.

1893. Descriptions of three new birds from the Sandwich Islands. Ibis, 1893: 112–114.

1893. [Notes on birds from Hawaii.] Ibis, 1893: 249–250, 256–257, 442–443, 570–571.—New species.

1893. [Rothschild's *Loxops ochracea* versus Wilson's *Himatione aurea*.] Ibis, 1893: 281–282.

1893. [*Palmeria dolei* (Wilson) is a true drepanid.] Bull. Brit. Ornith. Club, 3: 25.

1893. [Wilson's *Himatione dolei* is young of Rothschild's *Palmeria mirabilis*.] Bull. Brit. Ornith. Club, 3: 9.

1893. [Descriptions of *Acrulocercus bishopi*, *Himatione newtoni*, and *H. wilsoni* as new species.] Bull. Brit. Ornith. Club, 1: 41–42.

1893. [Original description of *Diomedea immutabilis* from Laysan.] Bull. Brit. Ornith. Club, 1: 48. Ibis 5: 448.

1893. [Original description of *Hemignathus lanaiensis* from Lanai.] Bull. Brit. Ornith. Club, 1: 24–25.

1893. [Original description of genus and species of *Pseudonestor xanthophrys* from Maui.] Bull. Brit. Ornith. Club, 1: 35–36.

1893. [Critical study of *Chasiempis*, and original descriptions of *Loxops wolstenholmei* and *Anous hawaiiensis*.] Bull. Brit. Ornith. Club, 1: 56–58.

1894. *Pseudonestor xanthophrys* a Drepanine Bird. Novitates Zool. 1: 692.

1895. Note on the *Loxops* of Oahu. Novitates Zool., 2: 54.

1899. [*Telespiza flavissima* is adult male of *T. cantans*.] Bull. Brit. Ornith. Club, 8: 56.

1893–1900. The avifauna of Laysan and the neighboring islands, with a complete history to date of the birds of the Hawaiian possessions. (London, R. H. Porter), 3 parts, xx + xiv + 320 pp., 83 plates.

1905. [New name for *Psittacirostra olivacea*.] Bull. Brit. Ornith. Club, 15: 45.

ROTHSCHILD, WALTER, AND HARTERT, E.
1925. [Original description of the now extinct *Sassius simplex* from the Hawaiian Islands.] Bull. Brit. Ornith. Club, 46: 51–53.
1926. Ein ausgestorbener Drepanidide: *Sassius simplex* Rothsch. and Hart. Jour. Ornith., Berlin, 74: 386–388, 1 pl.

SALVADORI, T.
1895. [*Nesochen sandvicensis*.] Cat. Birds Brit. Mus., 27: 126–127.
1895. [*Anas wyvilliana*.] Cat. Birds Brit. Mus., 27: 196–198.
1895. [*Anas laysanensis*.] Cat. Birds Brit. Mus., 27: 199.

SALVIN, OSBERT
1895. [Species of *Sterna, Procelsterna, Anous, Microanous* and *Gygis*.] Cat. Birds Brit. Mus., 25: 43–152.
1895. [Species of *Oceanodroma*.] Cat. Birds Brit. Mus., 25: 347–357.
1895. [Shearwaters and petrels.] Cat. Birds Brit. Mus., 25: 368–421.
1895. [Species of *Diomedea*.] Cat. Birds Brit. Mus., 25: 440–448.

SAUNDERS, HOWARD
1895. [*Microanous* proposed as genus for smaller noddy terns.] Bull. Brit. Ornith. Club, 4: 19.

SCHAUENSEE, R. M. DE
1941. Rare and extinct birds in the collections of the Academy of Natural Sciences of Philadelphia. Proc. Acad. Nat. Sci. Philadelphia, 93: 281–324.

SCHAUINSLAND, H.
1899. Das Vogelleben auf der Insel Laysan. Ornith. Monatsber., 7: 121–126, 144–150.
1899. Drei Monate auf einer Korallen-Insel. (Bremen), 104 pp.

SEALE, ALVIN
1900. Field notes on the birds of Oahu, H. I. Bernice P. Bishop Mus., Occ. Papers, 1 (2): 33–46.

SEEBOHM, HENRY
1890. On the birds of the Bonin Islands. Ibis, 1890: 95–108.

SEVERANCE, LUTHER
1904. Report of Committee on Birds. Hawaiian For. and Agri., 1: 83–85.

SHARPE, R. B.
1892. [*Rallus sandwichensis* is *Pennula ecaudata* King.] Bull. Brit. Ornith. Club, 4: 20.
1894. [*Porzana, Pennula, Porzanula, Gallinula, Fulica*.] Cat. Birds Brit. Mus., 23: 92, 114, 335–336, 133, 337, 177–180, 225.

SPALDING, IRWIN
1914. Hunting in Hawaii. Mid-Pacific Mag., 7: 430–435, 5 illus.

STEARNS, H. T., AND CLARK, W. O.
1930. Geology and water resources of the Kau District, Hawaii. U. S. Geol. Survey, Wash., Water Supply Paper 616, p. 60.—Discovery of *Geochen rhuax*.

STEJNEGER, LEONHARD
1890. Notes on a third collection of birds made in Kauai, Hawaiian Islands, by Valdemar Knudsen. Proc. U. S. Nat. Mus., 12: 377–386.
1893. Notes on a third installment of Japanese birds in the Science College Museum, Tokyo, Japan, with descriptions of new species. Proc. U. S. Nat. Mus., 16: 615–638.
1903. A new name for the Hawaiian bird genus Oreomyza. Proc. Biol. Soc. Wash., 16: 11–12.

STONE, WITMER
1894. A review of the Old World Rallinae. Proc. Acad. Nat. Sci. Philadelphia, 1894: 130–149.—*Pennula ecaudata* and *Porzanula palmeri*.

STONER, DAYTON
1923. The Mynah.—A study in adaptation. Auk, 40: 328–330.

SUSCHKIN, P. P.
1929. On some peculiarities of adaptive radiation presented by insular faunae. On the systematic position of the Drepanidae. Verh. VI Intern. Ornith. Kongr. in 1926: 375–381.

SWEZY, O. H.
1937. Notes on the California Quail in Hawaii. Proc. Hawaiian Ent. Soc., 9 (3): 432.—Foods.

SZYMKIEWICZ, DEZYDERY
1938. Quatrieme contribution statisque a la géographie floristique. Acta. Soc. Bot. Polon, 15 (1): 15–22.—Evolution in the light of endemic species on such islands as the Hawaiian.

THRUM, THOMAS G.
1909. [Introduction of English Sparrow.] Hawaiian Almanac and Annual for 1910: 9.

TOWNSEND, CHARLES H., AND WETMORE, ALEXANDER
1919. Reports on . . . expedition . . . "Albatross," from August, 1899, to March, 1900, . . . Mus. Comp. Zoöl., Harvard, Bull. 63 (4): 151–225.—Comparison with Hawaiian species.

TROUSSEAU, GEORGE
1892. Prospectus of the Hawaiian Ostrich Farm Co. (Honolulu, Hawaiian Gazette Co.), 44 pp.

VANDERBILT, GEORGE, AND DE SCHAUENSEE, RODOLPHE M.
1941. Zoological results of the Vanderbilt Nihoa Expedition. I. Summary of zoological explorations and the birds of Nihoa. Notulae Naturae, Acad. Nat. Sci. Philadelphia, no. 86, pp. 1–14, 1 pl.

VOLZ, WALTER
1905. Über die Ornithologie der Sandwich-Inseln. Ornith. Beob., 4: 98–102.

WALLACE, A. R.
1911. The Sandwich Islands: Birds. *In* Island-Life, Third and revised edition: 313–316. (London, Macmillan and Co.)

WESTGATE, INEZ W.
1931. Two bird importations into the South Seas. Mid-Pacific Mag., 42: 351–353.

WETMORE, A.
1924. A warbler from Nihoa. Condor, 26: 177–178.—*Conopoderas kingi*, sp. nov.
1925. Bird life among lava rock and coral sand. Nat. Geog. Mag., Wash., 48: 77–108, many photos, map.
1925. A note on the Fanning Island Warbler. Condor, 27: 212.—*Conopoderas pistor*.
1943. An extinct goose from the Island of Hawaii. Condor, 45: 146–148.—*Geochen rhuax*.

WILDER, G. P.
1905. A short trip to the Midway Islands with Capt. A. P. Niblack in the U. S. S. "Iroquois." Hawaiian For. and Agri., 2: 390–396.—Liberation of a dozen Laysan Finches on Midway.

WILLETT, G.
1919. Notes on the nesting of two little-known species of petrel. Condor, 21: 60–61.—*Pterodroma hypoleuca* and *Oceanodroma tristrami* on Laysan.
1945. The type of *Telespiza ultima* Bryan. Auk, 62: 139.
WILSON, SCOTT B.
1890. On a new finch from Midway Island, North Pacific. Ibis, 1890: 339–341, pl. 9.—*Telespyza cantans*, gen. et sp. nov.
1890. On some of the birds of the Sandwich Islands. Ibis, 1890: 170–196, pl. VI.—General and species accounts.
1891. On the Muscicapine genus *Chasiempis*, with a description of a new species. Proc. Zool. Soc., London, 1891: 164–166.—*Chasiempis gayi* from Oahu.
1891. Descriptions of two new species of Sandwich-Island birds. Ann. Mag. Nat. Hist. (ser. 6) 7: 460.—*Himatione mana* from Hawaii and *Phaeornis lanaiensis* from Lanai.
1891. Description of a new species of the genus *Himatione* from the Sandwich Islands. Proc. Zool. Soc., London, 1891: 166.—*H. dolei* from Maui.
WILSON, SCOTT B., AND EVANS, A. H.
1890–1899. Aves Hawaiienses: The birds of the Sandwich-Islands. (London, R. H. Porter), xxv, 257 pp., and numerous plates.
YATES, LORENZO G.
1897. The Laysan Islands. Overland Monthly, 30: 453–455, illus.

Department of Zoology and Entomology
University of Hawaii
Honolulu, T. H.

THE SEASONS OF BIRD SONG
THE BEGINNING OF SONG IN SPRING

BY ARETAS A. SAUNDERS

BIRD song is a distinctly seasonal phenomenon. The extent to which birds sing varies considerably from year to year. At the height of the breeding season, when practically every singing species is in full song, little can be learned concerning seasonal variation. But at the beginning and end of the season, and in off seasons, such as fall, the variation is readily noted. It is evidently caused, either directly or indirectly, by weather conditions, and is thus probably cyclical.

For more than thirty years I have kept records of the singing of birds, chiefly in southwestern Connecticut. Such data are necessarily limited by the ability and opportunities of the observer. When one can be in the field daily his observations on the first or last singing of common species are likely to be quite accurate. But if observations are limited to week ends, they cannot be so exact. My spring observations, after April 1, are practically daily, as I made it a habit to be out each morning early before working hours began.

The completeness of data concerning any one species is also lim-

ited by its abundance or rarity in the locality. With species common about my home, observations could be made even when there was no opportunity for a field trip. Locally distributed species can only be heard when there is opportunity to visit the places where they occur. Rare species are heard so infrequently that the data obtained from them have little value.

Data on the seasons of song are mainly of three sorts: the beginning of song in spring; the cessation of song at the end of the breeding season; and the revival of song after the postnuptial molt. Variations in the abundance of song in the height of the breeding season are mainly due to the condition of the nesting cycle and the particular habit of each species in that regard, and are not seasonal. This paper is limited to the beginning of spring singing, and I plan to follow it with papers on cessation and revival.

With the majority of summer-resident and transient species of southern Connecticut, the actual beginning of song must be determined at some locality farther south, for most of the birds arrive from the south in full song, and the date on which the first song is heard corresponds with the date of spring arrival. But this is not the case with residents, winter visitors, and a few transients and summer residents, so it is only with these species that my data on the beginning of song in spring are of value. Very early in the year the weather conditions are extremely variable. Some species, such as the Song Sparrow and the Meadowlark, sing more or less at any time through the winter and it is difficult to determine the difference between a winter song and the first spring song. A few warm, sunny days in February, or sometimes even January, will start birds singing, but if this is followed by a period of cold or snow, song ceases, to be resumed again after a week or two. Daily records show not only when the song begins, but when it becomes regular. This latter date is more important and less variable than the date of the first song.

The species on which I have data on the beginning of spring song follow.

The Bob-white (*Colinus virginianus*) is at present an exceedingly rare bird in Connecticut. It has always been variable in its numbers from year to year, and I have consequently omitted data in years when it was too scarce to hear it regularly. My data are based on observations in twenty seasons. One peculiarity is that in some years the first song is to be heard in mid-April, after which there is a period of silence until some time in May, when regular singing begins. My earliest date is April 10, 1921, but after that one observa-

tion no other singing was heard that year until May 14. In a number of years the song is not heard at all until May. The average date for the first song of the year is May 5, but the average for the beginning of regular singing is May 8. The latest date for the first song is May 24, 1936, but the bird was scarce that year. It is noticeable that in every year when the first date is later than May 20, that year is one in which the species was scarce.

The Mourning Dove (*Zenaidura macroura*) was quite rare in this locality previous to 1921, so that my data in earlier years are not significant. But about 1921 it increased considerably, and it has been common since then. The bird winters in considerable numbers, so that it is difficult to say just when migrating birds arrive. The date of first singing is exceedingly variable. It is my experience that non-passerine singers are likely to be much more variable in their singing seasons than passerine ones. In the past twenty-six years, when this species has been common, the average date of the first song is March 27. The earliest date is February 19, 1943, and the latest, April 17, 1923. This wide variation of nearly two months is not due to difference in the abundance of the species. The date when regular singing begins is also exceedingly variable. The average date is April 9. The earliest is March 25, 1945, and the latest, May 11, 1924.

The *phoebe* whistle of the Black-capped Chickadee (*Parus atricapillus*) is generally considered to be a song. There are a number of things about it, however, in which it differs from the songs of most birds, and one of these things is its irregularity as to season. I have heard it every month of the year except January. The earliest date on which it was heard averages, in thirty-two years of observation, March 13. The earliest date is February 5, 1938, and the latest, April 19, 1935. I have found it impossible to determine definite dates when regular singing begins, because the singing always seems to be irregular. For example, there is usually considerable singing in the month of April, but in 1920, 1928, and 1936, I heard no song at all from this species in April, though in all these years it was heard in March, and was common in May, except in 1928. When I first noted this, it looked like an eight-year cycle, but when 1944 came around I heard the song on two different dates in April of that year. Perhaps this irregularity is due, to some extent, to variations in the abundance of the birds, for there are years when they are comparatively scarce. But in some of the years when I recorded very little song, I nevertheless recorded the presence of Chickadees as frequently as usual and in normal numbers.

The song of the White-breasted Nuthatch (*Sitta carolinensis*) is not well known, probably because it is rather infrequent, not loud, and easily confused with the distant call of a Flicker. Like the Chickadee, this bird's singing habits are irregular, and there is some difficulty making sure just when the sound produced is a song. It is easy to distinguish between the well-known nasal call-note, and the series of soft whistles that constitute the song, but occasionally, at almost any season, the bird will utter a series of nasal call-notes, differing from the true song only in the quality of the sound produced. The question, then, is whether to call such a performance a song. If I do that, however, there will be practically nothing about it that is seasonal, whereas the more typical song is fairly definitely confined to late winter and spring. Yet there is more or less gradation between the extremely nasal performance and the more typical song, and the latter, though described as a whistle, always has a slight nasal character.

This more typical song generally begins in February or March, but occasionally is first heard in January. The average date is February 23, and the earliest, January 18, 1935. In 1929, when this species was comparatively scarce, I did not hear the song until May 10. But, except for that year, the latest date of the first song is April 5, 1924. I have been unable, from my data, to determine an average date when the song becomes regular, for it rarely is such. In some years the song may be heard almost daily through April and May, whereas in others, though the bird seems as common as ever, the song is heard only occasionally, and at most irregular intervals.

The Brown Creeper (*Certhia familiaris*), though present regularly in winter and in the spring migration, is heard singing in this region only rarely. I have heard it in only six years, and in most cases on only one date of the year. The records are too few to make averages of much value, but few enough to record them all. I have heard the song on the following spring dates: April 15 and 21, 1915; March 24 and 25, and April 22, 1917; April 5, 1922; April 15, 1927; April 21, 1935; and April 11, 1937.

The Winter Wren (*Troglodytes troglodytes*) sings rather sparingly during the spring migration. In some years I do not hear the song at all, though the birds are present. Occasionally a few birds remain all winter, and when that is the case the first song heard is likely to be earlier than when the birds occur only in migration. In only five years have I obtained a record of the first song after the birds have wintered. These years are 1917, 1929, 1938, 1942, and

1946. Under such circumstances the average date for the first song is March 31; the earliest, March 17, 1946, and the latest, April 10, 1938. Whenever I have heard the song in March it has been after a winter in which this species was present. In years when the bird is not found in winter the average date of the first song heard is April 20, the earliest is April 8, 1944, and the latest April 30, 1931. There are only eight such years, and in all the others the bird was either not found or was not heard in song. In late years this species sometimes occurs for a few days after May 1, but I have never heard the song in May.

The Brown Thrasher (*Toxostoma rufum*) normally is in full song when it first arrives in migration. There have been two years, however, when a bird spent the winter here and I was able to hear what was probably the first song of the year. In 1931, a wintering bird first sang on March 29. Summer-resident birds were not found that year until April 11. In 1944, a bird first sang on March 26. Summer residents were not noted that year until April 23.

The Robin (*Turdus migratorius*) is one of the few species that arrive in migration before they begin to sing. Because a few birds remain through the winter nearly every year, it is a little difficult to obtain the date of spring arrival with complete accuracy. But, using the dates that, in my judgment, were the first ones of spring arrival, the average first date, through a period of thirty-two years, is March 9. The average date of the first song heard is March 17. The earliest date of the first song is March 7, 1931, and the latest, March 30, 1916 and 1940. The length of time between the dates of first arrival and of the first song varies from two to thirty-one days. In 1920, the first birds arrived on March 23 and the first song was on March 25, but in 1922, the first migrants arrived February 22, but the first song was not heard until March 25.

One cannot predict from the first date of arrival, just when the first song will be heard. For example, the first arrival of migrants was March 6 in 1918, 1921, and 1926, but the first song in these years was March 19, March 11, and March 22, respectively. In 1931, 1936, and 1938, the first arrival was on March 7, and the first songs were on March 7, March 15, and March 13. For a time I believed that the first song coincided with the time that migrating flocks broke up and the birds scattered to their breeding grounds and selected territories, but later I noted a number of cases where the first songs came from birds that were still in flocks.

The Olive-backed Thrush (*Hylocichla ustulata*) is a regular transi-

ent in Connecticut in May. Though there seems to be a general idea that this species, like other transient thrushes, does not sing while in migration, it is my experience that it does. It does not sing commonly on the date of its first arrival, however, but some days later. In eight of the thirty-two years that I have recorded observations, I did not hear the song. These years are 1915, 1917, 1919, 1920, 1922, 1931, 1932, and 1940, most of them being years in which this species was rather scarce.

The average date of arrival of this species is May 12, and the average date of the first song, May 16. The earliest date of arrival is May 7, 1933 and 1944, and the latest, May 23, 1924. The earliest song heard was on May 7, 1944, and the latest on May 29, 1919.

The Veery (*Hylocichla fuscescens*), like the Robin, is a species that arrives in migration several days before it sings. The weather in May is much more settled than in March so that the period between first arrival and the first song is shorter than in the case of the Robin. The average date of arrival is May 6, but the average date of the first song is May 10. In six years, 1929, 1930, 1935, 1936, 1942, and 1943, the date of arrival and the first song coincided. The longest interval between arrival and the first song is nine days in 1931, when the first bird was noted May 6, but no song heard until May 15. The average length of time between arrival and the first song is three days. The earliest date for the first song is May 1, 1942, and the latest, May 18, 1919.

The Bluebird (*Sialia sialis*), like most other thrushes, usually arrives before singing, but there are exceptions. In seven years, 1914, 1921, 1923, 1924, 1926, 1934, and 1938, the first singing was heard on the day of arrival. In three years I heard singing in February from birds that, I had reason to believe, spent the winter. These dates are February 25, 1922; February 22, 1934; and February 13, 1937.

The average date of arrival of the Bluebird is March 10; the earliest, February 22, 1939; and the latest, March 25, 1916. The average date of the first song, leaving out the songs of wintering birds that I have mentioned, is March 18. The earliest is March 3, 1923, and the latest, April 2, 1940.

The Golden-crowned Kinglet (*Regulus satrapa*) is a winter bird whose song is very rarely heard during the spring months that it is with us. I have heard it just six times in the past thirty-two years. The dates are April 24, 1914; March 29, 1915; March 30, 1921; April 7 and 15, 1923; and April 24, 1926.

The Myrtle Warbler (*Dendroica coronata*) is the only warbler

that spends the winter in Connecticut, and therefore the only one for which I have data on the beginning of song; all the others are in song when they arrive in migration. The amount of song varies greatly in different years, sometimes beginning early, but in other cases the birds are in migration a week or more before singing begins. The earliest date of singing I have was, I believe, from a wintering bird, before migration began. This was March 23, 1941, but no further singing was heard that year until April 15. The average date of the first song is April 13, and the latest, May 2, 1920.

The Eastern Meadowlark (*Sturnella magna*) is a regular winter bird in the salt marshes along the Connecticut coast. Singing begins some time before summer-resident birds arrive or the wintering birds begin to move inland. In fact, the Meadowlark is one of our most persistent singers, and its song may be heard in every month of the year. So it is not a matter of when the very first song is heard, but one of just when regular spring singing begins. Each year there are practically always a few scattering dates of song in January or early February, and then a time when one hears the song almost every day, and from several birds rather than a single one. The date when this occurs varies greatly from year to year. The average date is March 9; the earliest, February 23, 1930; and the latest, April 1, 1916.

The Purple Finch (*Carpodacus purpureus*) occurs at all seasons in southern Connecticut, but is exceedingly erratic in its abundance and never common as a breeder. Its greatest abundance is in late winter or early spring, but in some years it is scarce even then. The amount of singing also varies greatly. In some years these birds sing a great deal, whole flocks singing together in choruses, while at other times, even though abundant, they sing little. In the big invasion of this species in 1939, for example (Weaver, 1940), the birds sang comparatively little.

The dates of first singing are variable, but they usually begin a period of song, so I have simply averaged them. The dates vary from January 30, 1926, to April 26, 1934, and the average is March 15. In 1933, I considered April 10 the earliest date, for it was that for the common type of song. But on April 1 of that year I found a bird singing the "vireo song" (Saunders, 1935, p. 246), a performance very different from the regular singing of this species.

The Pine Siskin (*Spinus pinus*) is an erratic winter visitor of this region, singing rather rarely when it lingers in the spring months. I have but a few dates, as follows: April 8 and 9, 1928; April 6 and 25, 1934; March 14, 21, 22 and 28, 1936; May 2, 1937; and May 10, 1944.

The Goldfinch (*Spinus tristis*) is present here throughout the year, though individuals are probably migratory. They sing abundantly long before the nesting season begins. The average date for the beginning of singing is April 3; the earliest, March 12, 1921; and the latest, April 24, 1934. In ten of the thirty-one years of observation, the first singing was in March, which must have been before the prenuptial molt which takes place in April and early May (Dwight, 1900, p. 179). Song is irregular in April. Probably they do not sing in the height of the molt, but observation of male plumages in April flocks indicates that all individuals do not molt at the same time. In two years, 1920 and 1936, when the song of this species was first heard in March, there was no more singing until after the first of May.

The Slate-colored Junco (*Junco hyemalis*) begins singing in March, or sometimes February, and continues until the end of its stay in late April or early May. The average date of the first song is March 12; the earliest, February 9, 1935; and the latest, April 7, 1932. In four out of thirty-two years I have heard the song in February. These early songs, however, are isolated, and mainly from single birds. Regular singing by the species, as a whole, begins later. The average date for this is March 27; the earliest, March 15, 1942; and the latest, April 16, 1939.

Before the beginning of regular singing, in February or March, one may sometimes hear primitive song from this species (Saunders, 1929, p. 48). Bicknell (1885, p. 146) describes this song of the Junco, and speaks of the bird as having two distinct songs. I have not used the dates of these songs in compiling averages, as they are not the regular song. Dates I have heard this song are February 28, 1930; March 12, 1932; March 1, 1933; March 6, 1937; and February 14, 15, and March 1, 1942. On several occasions I noted that the bird singing this song was a fully adult male, without a trace of brown in the plumage and with a dark, nearly black head. I mention this to show that this type of song is not always a juvenile song.

The Tree Sparrow (*Spizella arborea*) is a common winter bird that usually sings a little just before it leaves us for the summer. Sometimes the song is to be heard in February and even January. In other years it is not heard until the early days of April. In the past spring, 1946, I did not hear it at all. The average date of the first song, in thirty-one years in which I noted it, is March 2. The earliest is January 21, 1933, and the latest, April 5, 1914. The song becomes more frequent in late March and April, but the data are too fragmentary to determine an average date when regular singing begins.

The White-throated Sparrow (*Zonotrichia albicollis*), while most abundant in migrations, generally spends the winter in this region, though somewhat locally distributed at that time. These wintering birds begin to sing before the migration starts, commonly in March, often in February and occasionally in January. Usually these winter dates of singing are isolated; that is, separated from any regular period of singing by several weeks. In 1939, however, singing began on February 18 and was regular thereafter.

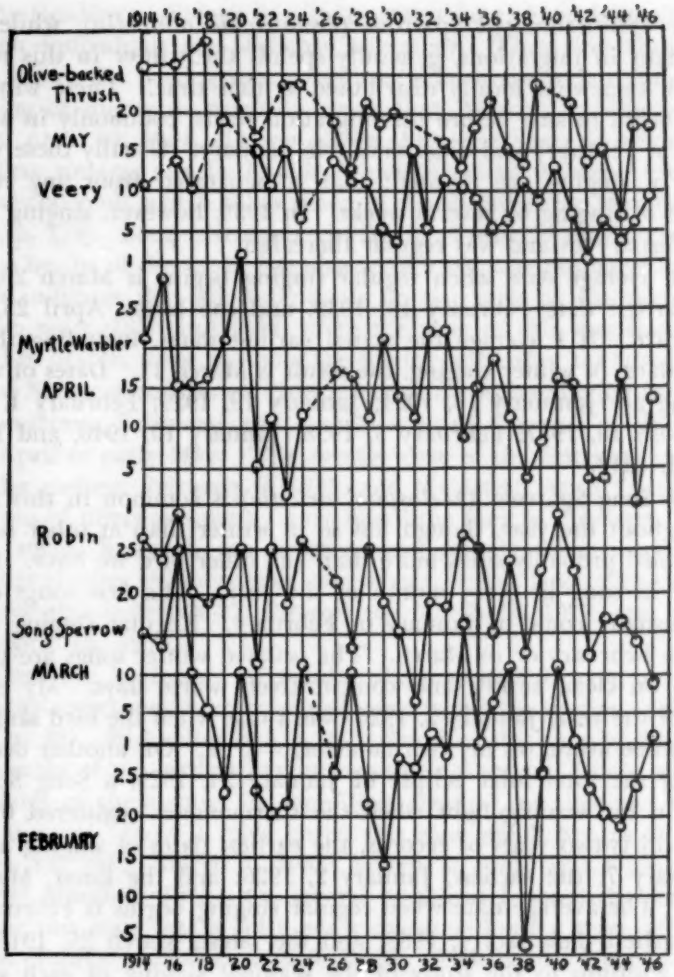
The average date when regular singing begins is March 26, with the earliest date February 18, 1939, and the latest, April 23, 1922 and 1928. If I average the actual earliest dates, including the isolated dates of winter singing, the result is March 11. Dates of winter singing are Januuary 13, 1924; January 19, 1929; February 1, 1936; February 16, 1937; February 5, 1938; January 10, 1940, and February 15, 1942.

The Song Sparrow (*Melospiza melodia*) is common in this region throughout the year, though less so in winter than at other seasons. This bird probably sings more than any other bird we have. I have heard its song in every month of the year. The first songs of the year usually come in January or February. Regular singing begins in late February or in March. The isolated winter songs are usually heard on clear, sunny, and comparatively warm days. My earliest date of the year, January 2, 1926, was a case when the bird sang with the temperature, on my thermometer, —2° F. On another occasion, during the total solar eclipse of January 24, 1925, a Song Sparrow sang in the waning light when the thermometer registered 0° F.

In thirty-two years of records, the earliest dates of singing average February 7; the earliest, January 2, 1926; and the latest, March 3, 1936. The average date when regular singing begins is February 28; the earliest, February 4, 1938; and the latest, March 25, 1916.

In addition to the study of the seasonal singing of each species, there is an additional interest in the comparison of different species from year to year. For illustration of this I have selected five common species whose songs begin at different times in the spring months. The diagram (Text-figure 1) illustrates this.

In this diagram I have used the beginning of regular singing for the Song Sparrow, but the first song heard for the other species. An exception to this is the single example of March singing of a Myrtle Warbler in 1941, mentioned above. It was an isolated song, and to have used it in the diagram would have confused the record with that of the Robin. In cases where I have no record of singing in



TEXT-FIGURE 1. Chart showing dates of first singing of five species from 1914 to 1946

certain years I have used a broken line to connect the records. This is true of all species in 1925 due to the unfortunate loss of a field note-book.

Different years differ not only in earliness and lateness but also in earliness at the beginning of the season, and lateness at the end, or vice versa. One may note in the diagram a certain amount of correlation between the species in the tendancy of lines connecting dates to become parallel. But this is not uniformly the case. For

example, the Robin and the Song Sparrow parallel each other pretty well from 1936 to 1942, but in 1922 they are far apart and in 1926 close together. A certain amount of the irregularity may be due to faulty observation. One cannot always be in the field at just the right time and place to hear the first singing of a particular species. One may conclude, however, that weather conditions from year to year determine the variations in the times that birds begin to sing, and that, in general, the effect is the same on different species that begin their singing at about the same time.

REFERENCES CITED

BICKNELL, EUGENE P.
1884–1885. A study of the singing of our birds. Auk, 1: 60–71, 126–140, 209–218, 322–332; 2: 144–154, 249–262.

DWIGHT, JONATHAN, JR.
1900. The sequence of plumages and moults of the passerine birds of New York. Annals N. Y. Acad. Sci., 13: 73–360.

SAUNDERS, ARETAS A.
1929. Bird song. New York State Museum, Handbook 7: 1–202.
1935. A guide to bird songs: I–XVIII, 1–285. (New York.)

WEAVER, RICHARD LEE
1940. The Purple Finch invasion of northeastern United States and the Maritime Provinces in 1939. Bird Banding, 11: 79–105.

Fairfield
Connecticut

GEORGE WILLETT (1879–1945)

BY HARRY HARRIS

Plate 5

ON the point of achieving the most distinguished honor within the power of organized American ornithology to bestow, George Willett, First Vice-President of the Union, Editor of the 'Ten-year Index to The Auk,' and Fellow since 1939, was taken by death on August 2, 1945, in his sixty-seventh year.

To those who knew intimately this wise and genial character it seemed inevitable that his superior, though utterly unconscious, talent for leadership combined with a sure instinct for avoiding wrong judgments should have marked him for advancement in his chosen science. His genius for friendship, his warm human sympathies free from all prejudice, his searching and judicious appraisements of men and motives, and his constant and unequivocal sincerity were among the personal qualities that led his colleagues in the Cooper Ornithological Club to view him in the light of a paternal and al-

ways dependable guide. His generosity in all things and his shrewd understanding of human nature contributed to his success as a teacher. He was saved from any trace of egotism by a penetrating sense of humor. A quiet dignity never deserted him.

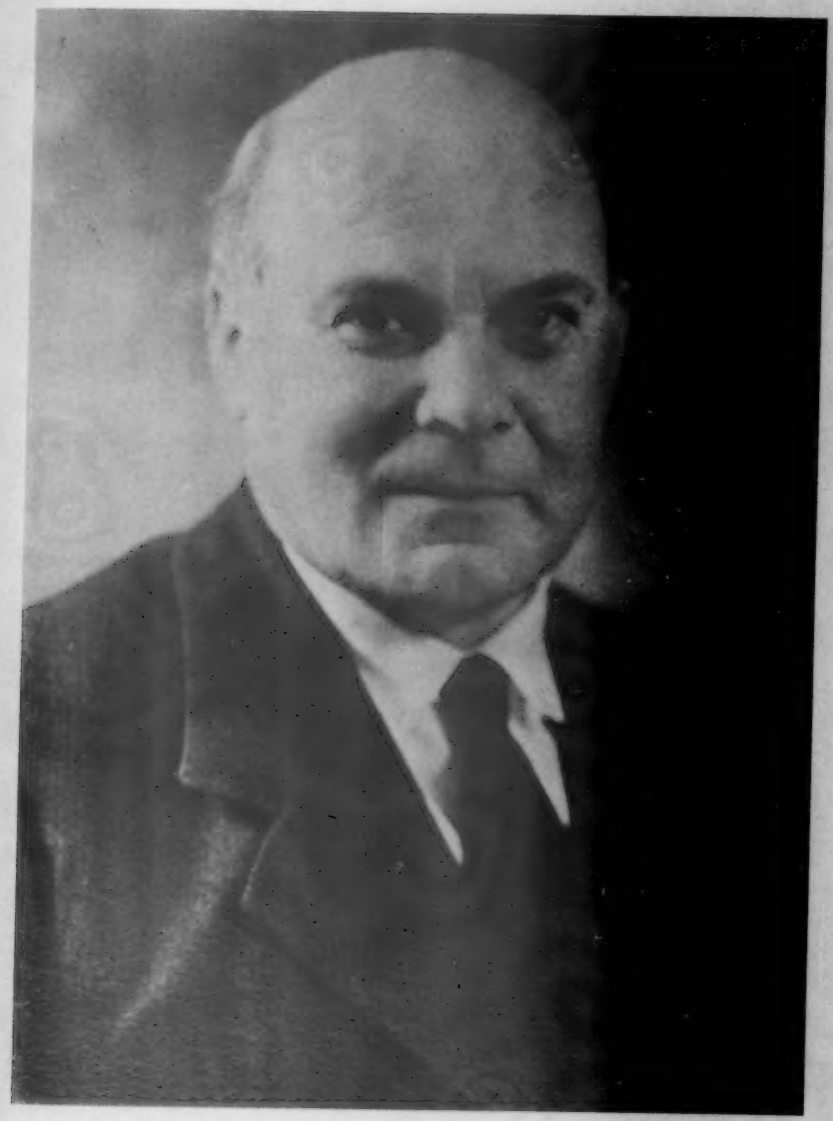
He was born in Hawkesbury, Ontario, Canada, May 28, 1879, the first of three sons of George Willett, an ordained minister of the Congregational Church, and Hannah Theodosia (Hill) Willett. He received early schooling in Cowansville, Quebec, whither the family had moved in his infancy, and later for a short time in Eaton Corner, Ontario. When his father's ministerial duties called him to Redlands, California, George, in his tenth year, was taken to live and to continue his primary schooling in that favored spot. Bringing from the rural Canada of his boyhood an already deeply implanted love for wild nature, especially for bird life, he was to find in the new environment conditions ideal for his steady growth in ornithology. The early beginning of his life-long devotion to the science was influenced and given direction by two potent factors peculiar to that period, namely, 'Nests and Eggs of North American Birds' (fourth edition, 1889) by Oliver Davie, and 'The Oologist,' a monthly trade journal published by Frank H. Lattin.

Further moves by the family took George to San Luis Obispo where he entered high school and where he found sea birds and Condors accessible, and to Whittier where he enrolled in Whittier College. A student of his huge proportions and initiative could not, of course, fail to make the football team, nor could an oölogist of his push and determination fail to gather in several sets of the Raven eggs then to be found in the near-by hills. By the mid-nineties he was gleaning a rich harvest of oölogical treasure, and at least one life interest was firmly established.

Shortly before the war with Spain, George had left home to seek his fortune in the orange groves of San Bernardino County where he had entered the California National Guard. Failing to see service with this unit, he enlisted in the United States Infantry and was on active duty in the Philippines during the Aguinaldo campaign. It is not surprising that he utilized the opportunity here to do some collecting.

At the termination of his military service he worked for a few months on the police force in Manila after which he returned to California. The year following his return he served for a time as recorder in the United States Geological Survey.

In 1904 he began eight years of police duty as a member of the



G. Willett

Los Angeles force. He brought to this employment many qualifications that soon won him recognition and promotion, as he could be relied on in any strenuous emergency to act with speed, strength, cool judgment and, if necessary, pugilistic finesse. For years he presided over Chinatown at a time when the tongs were often in open conflict. The crafty denizens of this district had great respect and admiration for Sergeant "Willie" and learned they could rely on his friendship and fair treatment as long as they remained on his side of the law. The dispatch with which he closed up gambling in this area, and the part he played in taking a box of set dynamite from the hands of a murderous fanatic at police headquarters are matters of record. The latter incident, recently recalled in the Los Angeles press, won him an official citation for bravery. In early 1905 he married Miss Anna Wells and a year later he was presented with George, Junior.

His entry into police work, with the added responsibility of a family to support, could well have marked the end of his ornithological ambition, but it marked, instead, the period of his real awakening in the science. He joined the Cooper Club and found himself surrounded by kindred spirits of high caliber, and began at once to carve out a unique niche for himself in the bird world. His spare time was spent in the field, usually with some Club enthusiast, in the accumulation of notes and specimens, and he was learning his way around in the literature. The Davie era was over; the epoch of Coues's 'Key' and Ridgway's 'Manual' had dawned with great promise. As time progressed, Willett and his friends ranged farther afield until by 1910 a considerable portion of southwestern California west of the mountains, including the Channel Islands, had been covered. Enough new material was thus assembled to warrant its summary in a separate publication, and George assumed the responsibility of its compilation. This digest, 'Birds of the Pacific Slope of Southern California,' published by the Cooper Club in 1912 as No. 7 in its Pacific Coast Avifauna series, proclaimed the arrival of a new major figure on the ornithological horizon and won for its author the reputation of possessing sound judgment, discretion and perspicuity.

The time had now arrived when the pull of ornithology could no longer be resisted and the break with law-enforcement routine was at hand. After first qualifying as a Federal Civil Servant and receiving his appointment in the Bureau of Biological Survey, the big police officer bade farewell to his Oriental charges and resigned from the force four months after the appearance of the paper mentioned.

George, now thirty-three years old and at the peak of his immense physical powers, was destined to become well acquainted with the rich Alaskan field. His first assignment was to the Sitka region. He returned from there to join a winter survey in which Alfred M. Bailey, now Director of the Colorado Museum of Natural History, took part. Mr. Bailey writes: "After spending a few days in Honolulu, during which time we destroyed eleven wagonloads of wings and feathers taken by Japanese poachers on Laysan, we sailed for that famous island where we arrived on December 22. We remained here three months collecting for the Survey and making a strenuous effort to exterminate the rabbits which were threatening vegetation.

"It was here that George's interest in shells was first aroused, and it was here also that he collected the first of the Hawaiian warm-water seals. Later we visited Pearl and Hermes Reef where we found the breeding colony. About this time he got a bad case of arsenical poisoning which gave him a difficult time, and to add to his misery he mutilated one hand in an encounter with a shark.

"We sailed from Laysan on March 10, and after considerable collecting on other islands were off Necker on the 19th where George indulged in one of his prodigious feats of strength and endurance. Necker is extremely precipitous, and the waves were rolling thirty feet up on the cliffs. It was impossible to get a boat close enough to land, so Willett took off all his clothes except his shoes and his helmet and allowed the waves to shove him up on the cliffs. He missed his hand-hold three times and dropped in the waves, but finally made it. When he came off he had the only egg so far taken of the Necker Island Tern, safely rolled up in a handkerchief and balanced rather precariously under his helmet."

The next few years Willett devoted to routine Government business in connection with bird refuges and bird protection, returning from Alaskan assignments each winter to resume inspection and patrol duties at various points in the west. This class of work proved to be a virtual continuation of his duties as a municipal peace officer with the compensating advantage that it took him into the wilds where bird life was concentrated, and where ample and continuous opportunity was offered for a steady flow of original contributions to the periodical literature.

Field work, hunting and trapping, recording data accumulated as a result of keen and intelligent observation, and above all the collecting of specimens for his own use constituted the breath of life for this indomitable spirit. It was inevitable that he should run

afoul of the Survey rule providing that no private collecting by the personnel is permitted at any time and that all material taken is Government property. To George this was unjust and intolerable, and he could not honestly bring himself to view it otherwise. He was unhappy, disappointed and frustrated under what he considered a dictatorial and unwarranted restriction.

The end of World War I found him in training for an officer's commission. On his release from this service he found remunerative employment as Federal Game Warden of the Los Angeles area, and thus again had occasion to recall that "a policeman's lot is not a happy one." After enduring the confinement a few months he resigned.

George Willett's life provides an outstanding example of what real enthusiasm for bird study can do to a determined man. He decided on the desperate measure of returning to his beloved Alaska as a free lance. The alluring certainty that he would be the master of his own time for study and collecting in a teeming environment beguiled him into the belief that it would not be impossible to support his family by salmon fishing and fur trapping. There would, at least, be no winter food shortage with an assured supply of frozen venison and other wild meat hanging in the wood shed, and he was soundly advised of other problems that faced him.

After about two years' trial of complete independence, during which time he waged a more or less successful battle with wild nature in various mainland and off-shore regions, the need for more dependable returns impelled him for the last time to take up his old successful specialty of law-enforcement. In 1921 he was accepted as a Deputy U. S. Marshal, first in Craig and later in Ketchikan, Alaska, and for the next four years he was busy with official routine to the near exclusion of his chief interests.

Being once more a single man, George found his ideal mate in Ora Alta Bellah, of Ketchikan, in 1925, the last year he was to spend in government work. After a trial at fox farming and a trip to the Aleutians in the interest of the Alaska Game Commission, the last move to Los Angeles was made at the end of 1926.

Two months after his arrival he was called to the staff of the Los Angeles Museum and began, in his late forties, the most productive period of his career. He brought to the Museum, as Ornithologist and Mammalogist, ripe experience and mature scholarship which united with his native personal charm and indefatigable industry to equip him for outstanding success as a museum official and teacher.

That George Willett was endowed to command universal respect, no less than to attract loyal friendships, is testified by several associates. Dr. Louis B. Bishop, part of whose large collection of birds had for years been stored in the Los Angeles Museum under Willett's care, recently said: "Willett was one of the finest men I ever met. He was a careful and conscientious ornithologist and conchologist, and a fine and able man. It was as a man I valued his friendship most."

The Director of Los Angeles Museum at the time of George's death, Mr. Roland McKinney, said: "The Museum has lost one of its most valuable staff members in the passing of George Willett. He was not only nationally recognized and respected as a scientist, but he was also admired for the warm human qualities he possessed, which endeared him to all who knew him. The memory of such a man will always serve as an inspiration to those he has left behind to carry on the significant work to which George Willett was devoted."

Dr. John Adams Comstock, Associate Director of the Museum in charge of Science, who was George's immediate supervisor, had this to say: "One phase of George Willett's character which particularly impressed me was emphasized by the respect and affectionate regard in which he was held by the young people who studied under his guidance. For a considerable number of months prior to his death the Science section of the Los Angeles Museum was conducting classes in museum techniques for high school students, and a large number of these young people came under his influence. It was particularly noticeable with his students that a profound impression was made on them, not alone as a result of the quality of his instruction, but even more as a reflection of his integrity, keen sense of humor, and deep understanding of human nature. That sort of inspiration will carry on in future generations as an ever widening circle of influence. It is the sort of immortality that I believe scientific men choose to contemplate."

Dr. Alden Miller early came under George's influence. He says: "Some vivid memories will ever attach to the name of George Willett. To me, as a youngster visiting at Cooper Club meetings in the Los Angeles Museum, he seemed to typify the Club and all its interests in birds. Just what it was that made such a forceful impression I am not sure. Perhaps it was the deep voice which I admired or the tales of adventure along the rugged Alaskan coast. But also I suspect it was the contagion of the group drawn to him by his sincerity, good humor, and lack of any touch of that self-importance which so easily becomes affixed to men of poise and striking stature.

"George Willett thought a lot, somewhere beneath the surface; and the counsel that stemmed from this was given carefully and in conservative vein on matters scientific and personal. He could always be counted on for editorial advice or for some chore of indexing or for looking up specimens and references. Ever patient and tactful, he accomplished much by these means; and the method never dulled but only well implemented his zeal for the things he believed in. Support for conservation, defense of the scientific collector, and a sane approach to nomenclatural changes were special objectives of his later years."

Mr. W. Lee Chambers, to whom Pacific Coast Ornithology is so greatly indebted for his long years of devotion to the handling of its vital fiscal problems, enjoyed a close friendship with George for over forty years. He says: "The possession of so many superior qualities put George Willett in a class by himself. I always deeply respected his strength of character no less than his great physical strength and dauntless courage. His innate honesty in scientific as well as personal matters was so deeply rooted that his outspoken defense of truth and justice as he saw it could always be depended on. This trait may have led, on at least one occasion, to his being misunderstood. George was altogether the right sort of a man."

It was on his arrival in 1927 to accept his last post that the present writer met George, and for a few years saw much of him. It is a grateful memory to have been accepted to friendship with a man so entirely free of any form of duplicity, or so well informed in ornithology and its literature and withal so modest and unassuming. He seemed never to find it expedient to emphasize another's fault, but rather than speak ill he preferred silence. His good nature and quiet humor and his consideration for others were dominant traits. The only excess he allowed himself was the pleasure of work. This writer has long been of the firm belief that George was of the same fiber and quality of character as another well-known man of the west who said, "I never met a man I didn't like."

THE SIXTY-FOURTH STATED MEETING OF THE AMERICAN ORNITHOLOGISTS' UNION

BY LAWRENCE E. HICKS

A. O. U. SECRETARY, 1937–1946

THE first meeting to be held in the Urbana-Champaign, Illinois, area took place September 2–6, 1946. Headquarters were in the Illini Union Building on the University of Illinois campus. This was the first regular program meeting and annual dinner since the Philadelphia meeting in September, 1942, since meetings of the previous three years had been restricted to one-day business sessions with only a limited number of Fellows and Members in attendance.

BUSINESS SESSIONS

The meeting on Monday, September 2, included two sessions of the Council, a meeting of the Fellows at 4:00 P. M. and a meeting of the Fellows and Members at 7:30 P. M. Twelve members of the Council, 24 Fellows and 49 Fellows and Members, respectively, were present at these three meetings. Fourteen members of the Council met again Thursday afternoon to complete business on the agenda.

Five Fellows, two Honorary Fellows, ten Members and 264 Associates were elected. Of the Associates elected, 227 or 86% had already paid dues—an all-time record. At the close of the meeting, the paid A. O. U. membership (as checked against the Treasurer's report) was as follows: Patrons, 7; Emeritus Fellows, 2; Honorary Fellows, 16; Corresponding Fellows, 68; Fellows, 50; Members, 140; Associates, 1,666. Total, 1,949. This is a net increase of 114 over the previous year, resulting, for the third consecutive year, in a new all-time high in membership numbers. In addition there were 228 subscribers to 'The Auk.' Including 41 exchanges, the number of copies of 'The Auk' mailed each issue is about 2,220.

The report of Treasurer Frederick C. Lincoln indicates receipts during the year of $8,668.61, not including $420.76 received by the Canadian account in the Bank of Montreal. Of $9,337.72 in disbursements, $7,098.80 went for manufacture of 'The Auk.' The cash on hand at the close of the year amounted to $785.18.

There have been 18 resignations (of Associates) and 35 deaths of members during the year: 5 Corresponding Fellows, 5 Fellows, 6 Members and 19 Associates. On December 1, 1946, the known vacancies were as follows: Honorary Fellows, 16; Corresponding Fellows, 7; Fellows, none; Members, 10; Associates, unlimited.

The report of the Investing Trustees shows that the A. O. U. En-

dowment funds, as of September 30, 1946, totalled $33,119.92. The net income for the year ending on that date was $1,667.88, representing average earnings of about 5.5%—a fine record.

The report of the Special Canadian Committee, given by Hoyes Lloyd, Chairman, indicates receipts of $420.76, expenses of $12.52 and present assets in bonds and bank account of $2,493.35.

This is the tenth annual report and proceedings prepared by your Secretary—and the last. Since he assumed the extensive burdens of that office at the Charleston, South Carolina, meeting in 1937, he has "processed" 2,487 new Associates elected during those years. Of these, more than 500 were obtained through personal effort. Nearly 40,000 outgoing and incoming letters have been handled. Extra sacrifice was required to carry his share of the A. O. U. work load through depression-recession years and the World War II period when regular meetings could not be held. Two resignations submitted during this period were ignored, and it at last became necessary at the Illinois meeting to issue an ultimatum of "I positively will not serve." Though the experiences and associations gained as Secretary during this period are considered priceless, it is with sincere gratitude that I welcome relief from the arduous and time-consuming responsibilities. Next year it will at last be possible to really enjoy an annual meeting! I only ask that my successor be extended the whole-hearted coöperation which has been given me.

During this decade the A. O. U. has made much real progress—milestones too numerous to mention here, but in which it has been a real pleasure to have had some small share. The steady growth of the organization is best reflected in the number of *paid-up* Associates—a net gain from 1937 to 1946 of 345.

1937	1,321	1944	1,463
1939	1,375	1945	1,560
1942	1,386	1946	1,666

A record number of five new Fellows were elected in 1946. An amendment legalizing mail ballots of the Council was given final approval. New amendments were given tentative approval and laid on the table for final action in 1947. These would make changes in the by-laws as follows:

(1) Patrons to be excused from paying further dues.
(2) Members and Fellows must be citizens or residents of the United States, Canada or Newfoundland at the time of election.
(3) Fellows to be limited in number to 50 not more than 65 years of age, but unlimited as to number above age 65.

(4) Limit on number of Members raised from 150 to 200, but not more than 15 to be elected in any one year.

Several gifts were accepted by the Council. The Council instructed the Secretary to add the name of Mrs. Dayton Stoner to the permanent roll as Patron. Her gift is to be called the Dayton Stoner Fund and added to the Educational Endowment Fund, the income to be used for student or veteran memberships in the A. O. U.

SPECIAL EVENTS

Tuesday afternoon at 4:30 Open House was held at the Illinois Natural History Survey. All of the many offices and laboratories concerned with problems in wildlife management were open for inspection. Tuesday evening, after the showing of special colored films, the members attended an exhibit and reception held at the University Y.M.C.A. arranged by the Champaign County Audubon Club. The exhibits included a display of the last seven paintings made by the late Major Allan Brooks, obtained through the courtesy of Dr. Leonard W. Wing and Washington State College. Wednesday afternoon was Open House at the Vivarium Building to see bird study techniques.

On Wednesday evening the Annual Dinner was held at the Urbana-Lincoln Hotel, featured by short anecdotes from a score of members concerning events of the war years, many of which were ornithological experiences of service men in foreign lands. On Thursday afternoon a wildlife management trip was taken to the Brownfield and Trelease Woods, owned by the University of Illinois, where studies in ornithology and ecology have been conducted since 1918. Also the Urbana Township wildlife restoration area was visited where methods are being tested for producing upland game crops on Illinois farm land. Friday was given over to an all-day field trip to the Lake Chautauqua Wildlife Refuge on the Illinois River near Havana, including the Illinois Natural History Survey Field Laboratory at that place.

ACKNOWLEDGMENTS

The Council voted to extend the appreciation and thanks of the American Ornithologists' Union to the University of Illinois, the Illinois Natural History Survey and the Champaign County Audubon Club for their kind hospitality and their generous assistance in arranging our Sixty-fourth Stated Meeting.

Special thanks were expressed to W. M. Luce, R. E. Yeatter, J. S. Ayars, A. F. Satterthwaite, Mrs. R. R. Snapp, Mrs. V. Vaniman, and

S. Charles Kendeigh (Chairman) of the Local Committee on Arrangements.

NEW MEMBERSHIP CERTIFICATES

The A. O. U. now has for distribution handsome membership certificates suitable for framing. The design by Francis Lee Jaques depicts a group of Great Auks amid rocks and surf. Members of any class, old or new, can get their copies by writing the new Secretary.

ATTENDANCE

The 1946 meeting was attended by about 300 persons including local visitors. Registered members and out-of-town visitors totalled 174: 2 Patrons, 24 Fellows, 25 Members, 78 Associates and 45 visitors. Members were present from three countries and 29 states or provinces: Illinois, 28; New York, 16; Ohio, 12; Michigan, 11; Ontario, 9; Wisconsin, 9; Washington, D. C., 6; California, 4; Kentucky, 4; New Jersey, 4; Minnesota, 3; Nebraska, 3; Georgia, 2; Indiana, 2; Iowa, 2; Maryland, 2; Massachusetts, 2; North Carolina, 2; Tennessee, 2; Connecticut, 1; Louisiana, 1; Missouri, 1; North Dakota, 1; Pennsylvania, 1; Washington, 1; W. Virginia, 1; Wyoming, 1; Costa Rica, 1.

CALIFORNIA, 4—*Fellows,* Alden H. Miller, Berkeley; Loye Miller, A. J. Van Rossem, Los Angeles. *Associate,* Robert W. Storer, Berkeley.

CONNECTICUT, 1—*Associate,* Richard Weaver, Greenwich.

COSTA RICA, 1—*Fellow,* Alexander F. Skutch.

GEORGIA, 2—*Fellow,* Herbert L. Stoddard, Thomasville. *Member,* Eugene P. Odum.

ILLINOIS, 27—*Fellows,* S. Charles Kendeigh, Champaign; W. H. Osgood, Chicago; *Members,* Emmet R. Blake, Victor H. Cahalane, H. Boardman Conover, Philip A. DuMont, Stephen S. Gregory, Jr., Chicago. *Associates,* Donald G. Allison, Champaign; Karl E. Bartel, Blue Island; William J. Beecher, Chicago; Frank Bellrose, Havana; E. A. Davis, Jr., Elmhurst; Paul E. Downing, Highland Park; Tappan Gregory, Chicago; Harold M. Holland, Galesburg; Ferd Luthy, Peoria; Peggy Muirhead, Wilmette; Roy M. Sallee, Macomb; Elizabeth A. Satterthwait, Henri C. Seibert, Victor E. Shelford, Urbana; Ellen T. Smith, Chicago; Paul Springer, La Grange; James O. Stevenson, George B. Thorp, Chicago; R. E. Yeatter, Urbana.

INDIANA, 1—*Associates,* Rev. John W. Baechle, Collegeville; Dorothy M. Hobson, Indianapolis.

IOWA, 2—*Associates,* Charles E. Ayers, Ottumwa; J. Harold Ennis, Mt. Vernon.

KENTUCKY, 4—*Associates,* Leonard C. Breecher, Louisville; Burt L. Monroe, Thomas Smith, Anchorage; James B. Young, Louisville.

LOUISIANA, 1—*Member,* George H. Lowery, Jr., Baton Rogue.

MASSACHUSETTS, 2—*Associates,* Austin F. Riggs, Jr., Cambridge; Oscar M. Root, North Andover.

MARYLAND, 2—*Member,* Joseph J. Hickey, Bowie. *Associate,* Margaret B. Hickey, Bowie.

MICHIGAN, 11—*Fellow,* J. Van Tyne, Ann Arbor. *Members,* Frederick N. Hamerstrom, Jr., Harry W. Hann, Ann Arbor; Miles D. Pirnie, Lawrence H. Walkinshaw, Battle Creek; George J. Wallace, East Lansing.

MINNESOTA, 3—*Members,* W. J. Breckenridge, Minneapolis; Olin S. Pettingill, Jr., Northfield.

MISSOURI, 1—*Associate,* Esther O'Conner, Kansas City.

NEBRASKA, 3—*Associates,* Jane M. Moser, R. Allyn Moser, Omaha; Mrs. Myron H. Swenk, Lincoln.

NEW JERSEY, 4—*Associates,* Mrs. Herbert E. Carnes, Tenafly; Hobart M. Van Deusen, Upper Montclair; Fred M. Packard, Passaic; William F. Rapp, Jr., Chatham.

NEW YORK, 16—*Patron,* Mrs. Dayton Stoner, Albany. *Fellows,* Arthur A. Allen, Ithaca; James P. Chapin, Jean Delacour, Ernst Mayr, Robert C. Murphy, John T. Zimmer, New York City. *Members,* P. Paul Kellogg, Ithaca; James Savage, Buffalo. *Associates,* Elsa G. Allen, Ithaca; Alfred E. Brandt, Ithaca; Mrs. James P. Chapin, New York City; R. A. Johnson, Oneonta; Theodora Nelson, New York City; Richard H. Pough, Pelham; Walton B. Sabin, Syracuse.

NORTH CAROLINA, 2—*Associates,* Howard T. Odum, Chapel Hill; Archie D. Shaftesbury, Greensboro.

NORTH DAKOTA, 1—*Associate,* O. A. Stevens, Fargo.

OHIO, 12—*Fellows,* Lawrence E. Hicks, Columbus; Harry C. Oberholser, Cleveland. *Members,* Edward S. Thomas, Columbus; Milton B. Trautman, Charles F. Walker, Put-in-Bay. *Associates,* John M. Anderson, Port Clinton; Paul E. Belcher, Akron; Herbert Brandt, Cleveland; George H. Breiding, Daniel L. Leedy, Columbus; Harold Mayfield, Toledo; George A. Petrides, Columbus.

ONTARIO, 9—*Fellows,* Harrison F. Lewis, Hoyes Lloyd, A. L. Rand, Ottawa. *Member,* L. L. Snyder, Toronto. *Associates,* C. H. D. Clarke, Toronto; Mrs. Osborne S. Mitchell, Streetsville; Doris H. Speirs, J. Murray Speirs, Toronto.

PENNSYLVANIA, 2—*Fellow,* W. E. Clyde Todd, Pittsburgh. *Associate,* Seth E. Gordon, Harrisburg.

TENNESSEE, 2—*Member,* Albert F. Ganier, Nashville. *Associate,* James T. Tanner, Johnson City.

WASHINGTON, 1—*Member,* Leonard W. Wing, Pullman.

WASHINGTON, D. C., 6—*Fellows,* Herbert G. Deignan, F. C. Lincoln, Alexander Wetmore. *Member,* John W. Aldrich. *Associates,* Malcolm Davis, Mrs. Roxie C. Simpson.

WEST VIRGINIA, 1—*Member,* Maurice Brooks, Morgantown.

WISCONSIN, 9—*Members,* Aldo Leopold, A. W. Schorger, Madison. *Associates,* Murl Deusing, Milwaukee; Cleveland P. Grant, Mineral Point; Walter E. Scott, Robert A. McCabe, Madison; Margarette E. Morse, Viroqua; Mrs. Walter E. Rogers, Appleton; Elmer W. Streblow, Green Bay.

WYOMING, 1—*Associate,* John W. Scott, Laramie.

ELECTION OF OFFICERS

The election of officers for 1946 resulted as follows: *President,* Hoyes Lloyd; *Vice-Presidents,* J. Van Tyne and Robert C. Murphy; *Secretary,* Olin S. Pettingill, Jr.; *Treasurer,* Frederick C. Lincoln; *Members of the Council* (in addition to officers and ex-presidents) for three years, George H. Lowery, Jr., S. Charles Kendeigh, A. J. van Rossem.

The Council re-elected John T. Zimmer, editor of 'The Auk,' Frederick C. Lincoln, Business Manager; Julian K. Potter, James

Savage and Rodolphe M. deSchauensee, Trustees, and the President, the Secretary, the Treasurer, Rodolphe M. deSchauensee and Ludlow Griscom, Members of the Finance Committee.

ELECTION OF FELLOWS, MEMBERS AND ASSOCIATES

HONORARY FELLOWS, 2—David Lack, Oxford, England; Dr. Pontus Palmgren, Helsingfors, Finland.

FELLOWS, 5—James Bond, Philadelphia, Pennsylvania; Herbert Deignan, Washington, D. C.; Jean Delacour, New York City; Hildegarde Howard, Los Angeles, California; Alexander Skutch, Quizarrá de Perez Zeledón, Costa Rica.

MEMBERS, 10—Logan J. Bennett, State College, Pennsylvania; Victor H. Cahalane, Chicago, Illinois; Donald S. Farner, Madison, Wisconsin; Harvey I. Fisher, Honolulu, Hawaii; Robert A. Johnson, Oneonta, New York; Aldo Starker Leopold, Monte Libano, México; Howard L. Mendall, South Brewer, Maine; Allan R. Phillips, Tucson, Arizona; Arthur C. Twomey, Pittsburgh, Pennsylvania; Emil Witschi, Iowa City, Iowa.

ASSOCIATES, 264—Of these, 227 had paid their dues before the date of the meeting. Names which did not come in before publication of the complete membership list in the October, 1946, number of 'The Auk' are included in a supplemental list in the present number.

THE PROGRAM

TUESDAY MORNING

Welcome by LEO ROY TEHON, Acting Chief, Illinois Natural History Survey.
Response by HOYES LLOYD, President, American Ornithologists' Union.
Roll Call of Fellows and Members, Report of the Business Meeting.
Announcement of the Results of Elections.
Report of the Local Committee on Arrangements, S. CHARLES KENDEIGH, *Chairman*.

1.* The Wide-Awake Fair of Ascension Island. JAMES P. CHAPIN, American Museum of Natural History, New York City.
2. Progress in bird sound recording. (Illustrated with phonograph records.) P. PAUL KELLOGG, Cornell University, Ithaca, New York.
3. An experiment in Starling management. A. A. ALLEN, Cornell University, Ithaca, New York.
4. Habits and voices of some southwest Owls. LOYE MILLER, University of California at Los Angeles, Cal.

TUESDAY AFTERNOON

Joint Session with the Inland Bird-banding Association

5.* Speciation trends observed in the Gulf of California. A. J. VAN ROSSEM, University of California, Los Angeles, Cal.
6.* Competition for niches in the spruce-fir forest of western Ontario. S. CHARLES KENDEIGH, University of Illinois, Champaign, Ill.
7.* Some bird populations in the eastern deciduous forest region. JOHN W. ALDRICH, U. S. Fish and Wildlife Service, Washington, D. C.
8.* Some fluctuations in the abundance of northern birds. LEONARD W. WING, State College of Washington, Pullman, Washington.

NOTE: Papers marked with an asterisk (*) were illustrated by lantern slides, and those with two asterisks (**) by motion pictures.

9. Returns from waterfowl banded at Pymatuning Lake. LAWRENCE E. HICKS, Ohio State University, Columbus, Ohio.

Business session and discussion, PRESIDENT C. C. LUDWIG of the Inland Bird-banding Association, presiding.

TUESDAY EVENING

Motion Picture Session

10.**Ungava and the Barren Grounds. W. E. CLYDE TODD, Carnegie Museum, Pittsburgh, Pennsylvania.

11.**Cruising the Labrador coast. A. A. ALLEN, Cornell University, Ithaca, N. Y.

WEDNESDAY MORNING

12.* The postnatal development of two broods of Great Horned Owls. D. F. HOFFMEISTER, University of Illinois, Urbana, Illinois.

13.* Studies of the Barn Owl in Michigan. GEORGE J. WALLACE, Michigan State College, E. Lansing, Mich.

14.* The courtship display of the Flightless Cormorant. MALCOLM DAVIS, National Zoological Park, Washington, D. C.

15. Behavior patterns and habits in the taxonomy of the Alcidae. ROBERT W. STORER, Berkeley, California.

16. Occurrences during migration of western nighthawks in eastern United States. (Exhibit of specimens.) LAWRENCE E. HICKS, Ohio State University, Columbus, Ohio.

17.* The use of the telescope in studies of bird migration. GEORGE H. LOWERY, Louisiana State University, Baton Rouge, Louisiana.

18.**Voice of the jungle (with slides, movies and records). A. A. ALLEN, Cornell University, Ithaca, New York.

WEDNESDAY AFTERNOON

19.* Problems in analysis of avian populations in California. ALDEN H. MILLER, Museum of Vertebrate Zoology, Berkeley, California.

20.* The 1945–46 Snowy Owl invasion in Michigan. C. T. BLACK, Department of Conservation, Lansing, Mich.

21. Evening Grosbeaks in the Ohio area during the winter of 1945–46. LAWRENCE E. HICKS, Ohio State University, Columbus, Ohio.

22.* Darién travelog. ALEXANDER WETMORE, U. S. National Museum, Washington, D. C.

23.**Bird life of Churchill, Hudson's Bay. A. A. ALLEN, Cornell University, Ithaca, New York.

THURSDAY MORNING

24. Pheasant population trends. DANIEL L. LEEDY, Ohio State University, Columbus, Ohio.

25. Some aspects of bird distribution. GEORGE A. PETRIDES, Ohio State University, Columbus, Ohio.

26. Breeding habits of certain wood warblers in the unglaciated Appalachian region. MAURICE BROOKS, West Virginia University, Morgantown, West Virginia.

27. Population densities and split ranges in relation to recent changes in distribution in the southeast. EUGENE P. ODUM, University of Georgia, Athens, Ga.

28.**Tropical birds of Trinidad. LAWRENCE I. GRINNELL, Ithaca, New York.

NOTE: Papers marked with an asterisk (*) were illustrated by lantern slides, and those with two asterisks (**) by motion pictures.

THE 1946 MEMBERSHIP CAMPAIGN

The 1946 membership campaign resulted in the election of 264 new Associates at the annual meeting. This brought the total paid-up A. O. U. membership to 1949, a net increase of 114 over 1945, and for the third consecutive year a new all-time high in membership numbers by a wide margin. By Council action, the Union now publishes each year the names of those responsible for obtaining new members, with the number obtained by each.

The list includes 94 names of those contributing to the campaign in 1946. Members of any class are eligible to nominate Associate members. Eighteen of the following names are members of the Membership Committee (see list in 'The Auk' for October, 1945, p. 664) and 52, or 18%, of the new Associates were obtained by members of this committee.

44 new members—Lawrence E. Hicks.
38 new members—Frederick C. Lincoln.
14 new members—Leonard W. Wing.
12 new members—Hoyes Lloyd, Hustace H. Poor.
9 new members—John W. Aldrich.
7 new members—John T. Zimmer.
6 new members—Arthur A. Allen, H. C. Oberholser, H. B. Wood.
4 new members—Emmet R. Blake, Paul L. Errington, Julian K. Potter, J. Stokley Ligon, L. L. Snyder.
3 new members—A. O. Gross, S. C. Kendeigh, W. B. Davis, Robert F. Logan, George H. Lowery.
2 each—W. J. Breckenridge, Paul E. Downing, Frank L. Farley, Walter T. Fisher, Dr. Edson B. Heck, Joseph J. Hickey, P. Paul Kellogg, Mrs. A. R. Laskey, Jean M. Linsdale, Ernst Mayr, W. L. McAtee, Alden H. Miller, R. Allyn Moser, Robert C. Murphy, James L. Peters, Arlie W. Schorger, Mrs. Dayton Stoner, Hobart M. Van Deusen, Col. L. R. Wolfe, R. E. Yeatter.
1 each—Jacob S. Abbott, William H. Behle, James L. Baillie, Jr., A. B. Bagg, Stanley C. Ball, W. Wedgwood Bowen, T. D. Burleigh, James P. Chapin, George R. Clark, Albert E. Conway, G. W. Cottrell, Jr., Jean Delacour, Gladys G. Fry, Donald S. Farner, John H. Grey, John M. Davis, Eugene Eisenman, Merrit C. Farrar, W. E. Griffee, Joseph A. Hagar, Henry M. Harford, J. Southgate Y. Hoyt, Irving Hempe, Stanley G. Jewett, Aldo Leopold, Howard Mendall, Harold D. Mitchell, J. J. Murray, Raymond O. Marshall, Charles E. Mohr, Gordon M. Meade, Tilford Moore, Charles K. Nichols, E. Virginia Orr, Olin S. Pettingill, Jr., H. des Reveiries, Aretas A. Saunders, Paul Springer, Robert E. Stewart, W. A. Squires, Charles E. Stevens, Jr., Wendell Taber, W. E. Clyde Todd, W. B. Tyrrell, M. G. Vaiden, B. H. van der Linden, A. J. van Rossem, George J. Wallace, Francis M. Weston, Alexander Wetmore, Laidlaw O. Williams.

DECEASED MEMBERS

During the year the Union lost 35 members by death: 5 Corresponding Fellows, 5 Fellows, 6 Members, 19 Associates.

SIR PETERS CHALMERS MITCHELL, Corresponding Fellow, 1919, aged 81, died at London, England, 1945 (?).

PROFESSOR OSCAR NEUMANN, Corresponding Fellow, 1928, elected from Germany, died at Chicago, Illinois, May 17, 1946.

MISS EMMA LOUISA TURNER, Corresponding Fellow, 1920, died at London, England, 1940 (?).

WALTER ERNST WAIT, Corresponding Fellow, 1925, died at Aldbury, England, 1943 (?).

HUGH WHISTLER, Corresponding Fellow, 1921, died at Battle, Sussex, England, 1943 (?).

DR. THOMAS BARBOUR, Life Fellow, (1903) 1929, died at Cambridge, Massachusetts, Jan. 8, 1946.

MAJOR ALLAN CYRIL BROOKS, Fellow, (1902) 1921, died at Okanagan Landing, British Columbia, Jan. 5, 1946.

DR. FRANK MICHLER CHAPMAN, Fellow, (1885) 1888, died at New York, N. Y., Nov. 15, 1945.

JOSEPH MAILLIARD, Life Fellow, (1895) 1913, died at San Francisco, California, 1946.

DR. THOMAS SADLER ROBERTS, Fellow, 1883, aged 88, died at Minneapolis, Minnesota, April 19, 1946.

CLINTON GILBERT ABBOTT, Member, (1898) 1931, died at San Diego, California, March 5, 1946.

HERBERT HUTCHINSON BRIMLEY, Member, (1904) 1934, died at Raleigh, North Carolina, March, 1946.

FRANK LORENZO BURNS, Member, (1891) 1901, aged 77, died at Berwyn, Pennsylvania, Feb. 7, 1946.

VERDI BURTCH, Member, (1903) 1934, died at Branchport, New York, Dec. 27, 1945.

MAJOR EDWARD ALPHONSO GOLDMAN, Member, (1897) 1902, died at Washington, D. C., Sept., 1946.

SAMUEL FREDERICK RATHBUN, Member, (1893) 1902, aged 83, died at Seattle, Washington, July 6, 1946.

HARRY APPLETON BROWN, Associate, 1939, died at Lowell, Massachusetts, Nov. 25, 1945.

JOHN W. EATON, Associate, 1941, of Osterville, Massachusetts, was killed in service, date (?).

MRS. JANE SHIELDS ELLIOTT, Associate, 1921, aged 76, died at Washington, D. C., Jan. 2, 1946.

RALPH ELLIS, Life Associate, 1924, aged 38, died at Berkeley (?), California, 1946.

ALLEN FROST, Associate, 1919, died at Poughkeepsie, New York, Jan. 9, 1946.

JOSEPH EDWARD GOULD, Honorary Life Associate, 1889, died at Norfolk, Virginia, Nov., 1945.

HARRY SEDGWICK HATHAWAY, Honorary Life Associate, 1897, died at Cranston, Rhode Island, March, 1946.

DR. DAVID CLARK HILTON, Associate, 1941, died at Lincoln, Nebraska, Dec. 12, 1945.

DAVID J. HOWELL, Associate, 1946, died at Los Angeles, California, 1946.

F. J. MALLOY, Associate, 1942, died at Cleveland, Ohio, 1946.

MISS ELIZABETH DAY PALMER, Life Associate, 1918, aged 73, died at Los Angeles, California, Dec. 4, 1945.

EUGENE ROCKWELL PIKE, Life Associate, 1926, died at Chicago, Illinois, 1946.

LOUIS HOPKINS PORTER, Honorary Life Associate, 1893, died at Stanford, Connecticut, 1946.

MISS HARRIET ELIZA RICHARDS, Honorary Life Associate, 1900, died at Brookline, Massachusetts, 1946.

GOLDSBOROUGH SERPELL, Life Associate, 1926, died at Norfolk, Virginia, 1946.

DR. HENRY NORTON TORREY, Life Associate, 1927, died at Detroit, Michigan, 1946.
HENRY EMERSON TUTTLE, Associate, 1909, died at New Haven, Connecticut, 1946.
HERBERT EUGENE WALTER, Honorary Life Associate, 1901, died at Providence, Rhode Island, Oct. 1, 1945.
REV. GORDON BOIT WELLMAN, Life Associate, 1908, died at Providence, Rhode Island, Oct. 1, 1945.

SUPPLEMENTARY LIST OF ASSOCIATE MEMBERS OF THE A. O. U.

ADAMS, MISS LETA E., 8705 Birchdale Ave., Cleveland 6, Ohio..... 1946
BAECHLE, REV. JOHN WILLARD, St. Joseph's College, Collegeville, Ind..... 1946
BAKER, ROSS STEWART, 5 Bain Ave., Toronto, Ont..... 1946
BALCH, FRANCIS NOYES, 130 Prince St., Jamaica Plain, Mass..... 1946
BALDWIN, STEPHEN G., R. R. 1, Catlin, Ill..... 1946
BARNES, CHARLES K., 2026 Lincoln Way West, South Bend 19, Ind..... 1946
BEATTY, ROBERT OWEN, Izaak Walton League of America, Inc., 31 N. State St., Chicago, Ill..... 1946
BOOCOCK, PHILIP M. B., 53 Colvin Ave., Buffalo 16, N. Y..... 1946
BRIGHAM, H. STORRS, JR., 3817 Sedgwick Ave., New York, N. Y..... 1946
BROCK, JEAN A. M., R. 5, Warson Rd., Kirkwood 22, Mo..... 1946
BUCK, THOMAS RANDOLPH, 2525 3rd St., N. E., Washington, D. C..... 1946
BURKE, MELVIN H., U. S. Forest Service, Enterprise, Ore..... 1946
BUSH, LEE, Cambria, Ill..... 1946
BUTLER, MRS. CHRISTELLA C., Grant Ave. and Ashton Rd., Philadelphia 14, Pa. 1946
CANT, GILBERT, P. O. Box 631, Summit, N. J..... 1946
DE MARS, ROBERT I., 1557 Fulton St., New York 57, N. Y..... 1946
DUNN, DR. FREDERICK SQUIER, 115 E. 61st St., New York, N. Y..... 1946
FISHER, FRANCIS DUMMER, Adams House, Cambridge 38, Mass..... 1946
FLICKINGER, MISS IDA MAY, 1519 N. Barton St., Arlington, Va..... 1946
FOCHT, RALPH G., 3020 Tilden St., N. W., Apt. 101, Washington 8, D. C..... 1946
GAU, DANIEL JOSEPH, Camrose, Alberta, Canada..... 1946
GOLDSMITH, HAROLD FRANK, 6534 N. Francisco Ave., Chicago 45, Ill..... 1946
GRUTZMACHER, HAROLD MARTIN, 103 S. Harding St., Grayslake, Ill..... 1946
HESSELSCHWERDT, ROBERT E., R. 2, Urbana, Ill..... 1946
JAMES, DOUGLAS A., 25455 Dundee, Huntington Woods, Mich..... 1946
KILLIP, THOMAS, III, 139 Edgeview Lane, Rochester 10, N. Y..... 1946
KIRBY, EDWARD VINCENT, 5259 Union Ave., Chicago 9, Ill..... 1946
LAPHAM, VIRGIL TEXAS, Box 8913, University Station, Baton Rouge 3, La..... 1946
LATVEN, K. CHARLES, M. D., 3224 N. Abingdon St., Arlington, Va..... 1946
MCCABE, ROBERT A., 424 University Farm Place, Madison 5, Wis..... 1946
MILLER, J. ROBERT, 1523 E. Jefferson, Detroit 7, Mich..... 1946
MINOR, WILLIAM FAULKNER, 1108 Park St., Charlottesville, Va..... 1946
PATE, MISS LENNIE ELIZABETH, 1315 E. Cervantes St., Pensacola, Fla..... 1946
PHELPS, WILLIAM H., JR., Almacen Americano, Caracas, Venezuela..... 1940
RAM, SINGH S., Chicago Natural History Museum, Chicago, Ill..... 1946
RICH, MRS. EVA., 150 W. 80th St., New York 24, N. Y..... 1946
SCHUSTER, EDWARD FRED, 18188 Clifton Rd., Lakewood 7, Ohio..... 1946
SCHWALBE, PAUL, Box 64, Lenni, Pa..... 1946
SMITH, ROBERT SKALAK, 12904 Melgrove Ave., Garfield Heights, Cleveland, O. 1946
SPRAGUE, MARSHALL, 1523 Wood Ave., Colorado Springs, Col..... 1946

STEWARD, MISS MILDRED, 1258 E. 101 St., Cleveland 8, Ohio 1946
STILLER, CLIFFORD REGINALD, Botha, Alberta, Canada 1946
TAYLOR, HOWARD GORDON, 1063 E. 4th South St., Salt Lake City 2, Utah ... 1946
THROCKMORTON, MICHAEL, 802 N. 25th St., Boise, Idaho 1946
WANAMAKER, JOHN, 3233 Perkins Lane, Seattle, Wash. 1946
WELSHANS, WALLACE ALFRED, JR., Rosedale, Miss. 1946
WHITAKER, JAMES LONG, Adams Ave. and Tabor Rd., Philadelphia 20, Pa. 1946
WILLIS, MISS ANNE EDWARDS, Coalburgh, W. Va. 1946

AMERICAN ORNITHOLOGISTS' UNION

REPORT OF THE TREASURER, FISCAL YEAR ENDING AUGUST 15, 1946

RECEIPTS

Balance from 1945		$ 1,454.29
Dues:		
Fellows	$ 130.00	
Members	427.00	
Associates	4,234.83	
Life (all classes)	350.00	
		5,141.83
Subscriptions to The Auk		750.84
Sales of publications (back Auks, supplements, etc.)		272.22
From authors for reprints		276.78
Sale of Auk Indexes		51.05
Sale of Abridged Check-Lists		8.50
Contributions		500.00
Special funds:		
General Endowment	$ 939.57	
Educational	25.17	
Brewster Memorial	396.06	
Ruthven Deane	254.36	
Bird Protection	52.23	
		1,667.39
Total to be accounted for		$10,122.90

Funds in Bank of Montreal, Ottawa, Ontario, as per statement of August 15, 1946 ..... 918.35

Special fund for publication of new Check-List (on deposit in American Security & Trust Co., Washington, D. C. 500.00

DISBURSEMENTS

Manufacture of The Auk:		
October, 1945	$1,364.56	
January, 1946	1,352.28	
April, 1946	1,472.43	
July, 1946	1,651.87	
Editor's honorarium	750.00[1]	
Mailing (includes mailing of back numbers, corrections to mailing list, stencils, etc.)	507.66	
		7,098.80
Reprints (repaid in part by authors)		463.31
Purchase of back numbers of The Auk		42.78
Brewster Award to Hans Albert Hochbaum		265.06[2]
Refunds (chiefly overpayments)		6.00
Contributions:		
Zoological Society of London	$ 25.00	
Internat. Comm. on Zool. Nomenclature	10.00	
		35.00
Checks returned (makers deceased, accounts closed, etc.)		41.94
Service charges by bank		35.00
Miscellaneous:		
Packing and freight charges on shipment of publications from American Museum in New York City to Bowie, Maryland	$ 164.38	
Exchange charges (2 checks)	.50	
		164.88
Administrative Expenses:		
Membership Committee (stationery and postage)		41.25
Office of the Secretary (Clerical help, postage, job printing, etc.)		347.21
Office of the Treasurer and Business Manager (Honorarium to Asst. to the Treasurer, postage, stationery, mailing of bills, parcel post, express, etc.)		796.49
Total expenditures		$ 9,337.72
Balance on hand August 15, 1946		785.18
		$10,122.90

FREDERICK C. LINCOLN, *Treasurer and Business Manager.*

[1] Includes 3rd and 4th quarters of 1945 and 1st, 2nd, and 3rd of 1946.

[2] Difference between amount produced by fund and that paid to recipient, made up by life membership and purchase of back numbers of The Auk.

GENERAL NOTES

The Button Quails and Tree Sparrows of the Riu Kiu Islands.—In comparing certain specimens taken on the island of Okinawa in the summer of 1945, I have reached conclusions somewhat at variance with current treatment of two species. I am indebted to the authorities of the American Museum of Natural History and of the United States National Museum for making possible these studies.

The Button Quails (*Turnix suscitator*) of the Riu Kiu Islands are generally referred to *blakistoni* of southern China, despite the existence of another race (*rostrata*) in the intervening island of Formosa. It is true that Formosan birds are much darker and grayer above than either Chinese or Riu Kiu specimens; but the latter are not identical with *blakistoni*, and evidently represent an undescribed race, which may be known as

Turnix suscitator okinavensis, subsp. nov.

Type: American Museum of Natural History, no. 544507; male; island of Okinawa, Riu Kiu Islands, April 27, 1904; from the collection of Alan Owston.

Subspecific characters: Resembles *T. s. blakistoni*, but bill distinctly heavier, about as in the birds of central Siam (Deignan, MS.). A relatively brown bird above, but paler than other races examined; I have not, however, seen the pale Indian races (*taigoor, isabellinus*).

Range: Southern and central Riu Kiu Islands.

Specimens from Okinawa appear to be more typical than those from Miyako and south, which show a slight approach to *rostrata* in their larger bills and slightly grayer color above; in color they resemble *blakistoni* closely, but are perhaps a trifle paler.

The Tree Sparrow (*Passer montanus*) of the Riu Kiu Islands was long ago named *saturatus* on the basis of a mounted bird taken by Stimpson. According to Deignan's studies, Stimpson's collecting was done on Okinawa; the type agrees well in bill size with recently taken Okinawa birds, and its darkness is probably due to its having been mounted. Bill size seems to reach a minimum on Okinawa; Japanese birds (especially those from Hokkaido) are larger-billed, as are also the birds of Miyako and south, which I cannot distinguish from *taivanensis* in any way. Small bills are again found in northern China.

Aside from the bill, there appears to be no geographic variation in size, unless perhaps the tail averages relatively longer in Chinese birds. The difference, if any, is slight. My studies do not confirm the claim that Formosan birds are any smaller or shorter-tailed than Japanese.

In color, Okinawan and Formosan birds are paler and grayer (almost purplish) brown on the crown, and also paler on the back and wings, than Japanese birds; the wing-bars are whiter (less buffy), and the edgings of the greater wing-coverts are less ruddy. The sides, flanks, crissum, and rump, on the other hand, are a deeper and more reddish brown than in either Japanese or Chinese birds.

Chinese birds are pale and gray above, agreeing well in color with *taivanensis* and *saturatus* except for their paler and grayer rumps, sides, flanks, etc. Birds from Weihsien seem especially gray.

Specimens from southern Japan (Tanegashima) show some approach to *saturatus*, averaging paler above and browner on the flanks than Hokkaido birds. They are closest to the latter, however. But I cannot agree that Japanese birds are *saturatus;* if Formosan birds are separated solely on bill size, then surely Japanese birds, differing in bill size and in color, must be separated. I have seen no specimens from the Seven Islands of Izu, and do not know the proper names for the Japanese and Chinese birds. Those of the Riu Kiu Islands should stand as:

(1) *Passer montanus saturatus* Stejneger. Kikaigashima, and probably Amami-Oshima, south to Okinawa.

(2) *Passer montanus taivanensis* Hartert. Miyakojima and Ishigaki to Formosa.—ALLAN R. PHILLIPS, *Museum of Northern Arizona, Flagstaff, Arizona.*

Notes on Phylloscopus coronatus ijimae.—Three of these little-known Willow Warblers were taken in the southern part of Okinawa Shima, Riu Kiu Islands, in the fall of 1945. Unfortunately, two were lost subsequently, but in view of the bird's rarity, it seems worth while to place on record the notes that were made on them in the field.

My first specimen, a young bird sexed doubtfully as a female, was shot by G. F. Augustson at Iwa, near the south end of the island, August 10. It was feeding with *Zosterops* in a tree by a native house. In southern Okinawa, trees grow only in such compounds. On picking it up, Augustson told me that he had shot a similar bird at "Bolo Point," the western tip of central Okinawa opposite the Katchin Hanto peninsula, in July (or at least after his arrival on June 4). It is unfortunate that this was not preserved, as July would seem to be exceptionally early for any *Phylloscopus* on Okinawa. I saw no others of this genus until late September.

From September 26 to early October, warblers of this genus were quite common about Momobaru, a hill village south of Kadena. A young *ijimae* (not sexed) and an adult male *borealis* were taken on September 26, and two more adult male *borealis* on the 28th. By October 13 they were scarcer, but a fine adult male *ijimae* was taken that day, and a Crowned Willow Warbler was also seen but not secured. The latter had a distinct median crown-streak, but less conspicuous than its superciliary, and the sides of the crown appeared greenish rather than dark brown, so I judged it to be *ijimae*. Thereafter a few *Phylloscopus* were seen until October 22, apparently all *borealis*.

It seems a bit strange that no *P. b. xanthodryas* were secured on southern Okinawa. Perhaps they prefer the more heavily forested areas farther north.

The three adult male *borealis* taken were, on the basis of color and measurements, *P. b. borealis*. The two September and October *ijimae* were compared with these and found to differ by (1) greener upper parts, with crown and nape grayer (less brownish olive), and clearer white under parts with yellower crissum and under wing-coverts; (2) mandible yellowish, without the dark tip of *borealis*, and bill perhaps a bit broader; (3) tarsi horn-color, darker than the feet, rather than both light horn, as in *borealis;* (4) ninth [next to outermost] primary shorter than fifth; and (5) post-nuptial molt complete, with the remiges and rectrices of the adult fresh, in striking contrast to the worn condition of *borealis*.

The adult male differed from the unsexed immatures in larger size (flattened wing about 66–67 mm., rather than 59–61), and especially in broader remiges and rectrices. In addition, the September immature had the ninth primary shorter than fourth, eighth shorter than sixth, fifth slightly emarginate on outer web, and tail not emarginate; but the August immature, now in the collection of the American Museum of Natural History, agrees in all these respects with the adult.

Phylloscopus coronatus ijimae is now known as a migrant on Okinawa in late March (Kuroda, Tori 5:85, 1926), August 10, and late September to mid-October, and has probably occurred casually as early as July. I know of no breeding or mid-winter records.—ALLAN R. PHILLIPS, *Museum of Northern Arizona, Flagstaff, Arizona.*

A new wren from Chiapas, México.[1]—The species *Thryothorus rufalbus* Lafresnaye is not recorded in literature from north of the highlands of Guatemala, although as long ago as 1893 E. H. Skinner collected a worn, molting, non-sexed example at Tapachula, Chiapas (U. S. Nat. Mus. 206027, Biol. Surv. Coll.). In May, 1940, Mrs. H. M. Smith obtained two adult males at Finca Juarez, not very far from Tapachula in extreme southwestern Chiapas. Finally, in April and May of the following year, the collectors working for Sr. E. Matuda of Escuintla, Chiapas, procured three adult males at Santa Rosa and Jalapa, near Escuintla. These examples are now in the Museum of Comparative Zoölogy. The six birds have been compared and prove to be of an undescribed subspecies, which may be known as

Thryothorus rufalbus transfinis new subspecies

Type: M. C. Z. 273121, ad. ♂, collected at Jalapa, Escuintla, Chiapas, México, April 11, 1941, by "E. C."

Subspecific characters: Similar to the nominate form from Guatemala but with a much longer tail; from *castanonotus* it differs even more as the latter is a race with the tail still shorter than in typical *rufalbus*. The tail length of *transfinis* varies from 57.2–69 mm., with an average of 62.8 mm.; in *rufalbus* it is 56–58 (57 mm.); in *castanonotus* it measures 46.5–57.5 (51 mm.).

Measurements of type: Wing, 70.2; tail, 69; culmen from base, 20.6 mm.

Range: extreme southwestern Chiapas (Tapachula and Finca Juarez, to Santa Rosa and Jalapa, near Escuintla).

For the opportunity to study, and for permission to use one of his specimens for the type of this race, I am indebted to Mr. James L. Peters of the Museum of Comparative Zoölogy.—HERBERT FRIEDMANN, *U. S. National Museum, Washington, D. C.*

A second specimen of "Tangara gouldi" (Sclater).—While rearranging the series of tanagers of the genus *Tangara* in the collection of the Academy of Natural Sciences of Philadelphia, I came across a specimen of "*Calliste gouldi*" Sclater, previously known only from the type in the British Museum. The skin (A. N. S. P. no. 7203), part of the Duc de Rivoli (Massena) Collection, was donated to the Academy by Dr. T. B. Wilson. It agrees well with Hellmayr's comprehensive description of the type [Cat. Birds of the Americas, 13 (9): 92, footnote 2, 1936]. Apparently the only color differences are as follows. The black throat patch is not "bordered all round by a narrow dark blue line," but is merely very narrowly bordered posteriorly with dark blue. There is a narrow, golden yellow band (about 3 mm. in width) across the extreme upper portion of the chest, although the remainder of the upper chest is "bright grass green." Finally, the feathers of the anterior upper parts are much more (not "slightly more") golden green than in *T. desmaresti*. The Academy's specimen, an unsexed adult without locality, has the wing 71 mm., tail 51, bill 12 in length, and thus agrees closely with the type in measurements.

Although Hellmayr states (*l. c.*) that "there can be no doubt as to its constituting a perfectly good form," it is my opinion that "*T. gouldi*" is a hybrid between *Tangara cyanoventris* (Vieillot) and *T. desmaresti* (Vieillot), since its characters are clearly intermediate. I have shown the skin to Dr. Ernst Mayr, who agrees with me as to its hybrid origin. Furthermore, Dr. John T. Zimmer, who later examined the specimen, has likewise concurred in this opinion.—JAMES BOND, *Academy of Natural Sciences, Philadelphia.*

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[1] Published by Permission of the Secretary of the Smithsonian Institution.

The name of the Javanese Bush Warbler.—In my revision of the Bush Warblers of the genera *Cettia* and *Bradypterus* (Ibis, 1943: 28), I inadvertently used the name *montana* for the Javanese form of *Cettia fortipes*. It now appears that *Sylvia montana* Horsfield 1821, so far applied to the bird, is antedated by *Sylvia montana* Wilson 1812, which is attached to a species of Parulidae. Therefore a new name is required for the Javanese bird.

In the Handlist of Malaysian Birds (p. 253), Chasen used *montana*, but he mentions as a synonym *Sylvia vulcania* Blyth, Ibis, 1870: 170, Java (nomen nudum). The quotation from Blyth's article is as follows:

"NEORNIS MONTANA? (Horsfield) (*vide* Ibis, 1867, p. 27); *Sylvia vulcania* S. Müller. Wholly dark brown, paler below, whitish on the throat and along middle of lower parts; a slight pale supercilia; wing 2.5 in.; tail 2.75 in., much cuneated. Hab. 'Java and Timor', Leyden Museum."

The above is a good description of the bird. According to Opinion 4 of the International Commission: "Manuscript names acquire standing in nomenclature when printed in connection with the provisions of Art. 23, and the question as to their validity is not influenced by the fact whether such names are accepted or rejected by the author responsible for their publication."

The name *vulcania* is valid and not in the least a *nomen nudum*. Therefore the Javanese bird must be known as *Cettia fortipes vulcania* Blyth 1870. Solomon Müller never apparently published the name, which was probably written by hand on a label in the Leyden Museum, where it was picked up by Blyth at the time of his visit there in 1869 which he mentions at the beginning of his article in the Ibis, 1870 (p. 157).

Finch mentions the name slightly differently spelled—"*Sylvia vulcana* S. Müll."—in Mus. Lugd., as a synonym of *Cettia montana* (Notes Leyden Museum, 22: 208, 1900). The fact that he put it in brackets seems to indicate a previously unpublished name, as we presume it is. The specific name for this group of Bush Warblers is *Cettia fortipes* Hodgson 1845.—J. DELACOUR, *American Museum of Natural History, New York, N. Y.*

The subspecific name of the Malaysian Green Imperial Pigeon (*Ducula aenea*).—As shown by E. Mayr [The Birds of Timor and Sumba, Bull. American Mus. Nat. Hist., 83 (2): 147–148, 1944], the subspecific name *aenea* must be restricted to the birds from the Lesser Sunda Islands. Also, contrary to my recent statement (Zoologica, 31: 1, 1946), the name *consobrina* Salvadori 1887 (Nias) should be restricted to the group of West Sumatran Islands except Engano, where a distinct race is found (*aenothorax*).

The birds of the Malay Peninsula, Sumatra, Borneo, Java and neighboring islands are decidedly grayer on the head and neck than *consobrina*. The earliest available name for them is *polia* [*Muscadivores aeneus polius* Oberholser, Bull. U. S. Mus., 98: 18, 1917; Santian Islands (Anamba Islands)].—J. DELACOUR, *American Museum of Natural History, New York, N. Y.*

Nest stealing by Black-headed Grosbeak.—An observation which I made on June 18, 1946, while in the Yosemite Valley, I thought was very interesting. I was resting on the ground on the edge of the old apple orchard near Camp Curry, when I noted a female Black-headed Grosbeak (*Pheucticus melanocephalus maculatus*) pulling dry grasses and weed stems from a nest in an apple tree overhead. When she had a sufficiently large beakful she flew to my left and disappeared through the yellow pines on the edge of the orchard. I waited for her to return and again watched

her through my field glasses carefully gathering nesting material from the nest overhead and flying off in the same direction as before. I followed her course by traversing the carpet of ferns and golden brodiaea and located her moulding out her nest fifteen feet up in another old apple tree.

The nest from which she stole the material was that of a Brewer's Blackbird (*Euphagus cyanocephalus*) from which the young had just recently departed. Blackbirds were still vociferously scolding passers-by because of young blackbirds in the vicinity.—EMERSON A. STONER, *Benicia, California.*

Fairy Bluebird—long-tailed macaque association on Mindanao.—In part 2 of his 'Birds of the Belgian Congo' (Bull. Amer. Mus. Nat. Hist. 75: 352, 1939) Dr. James P. Chapin states that the Long-tailed Hornbill (*Tropicranus-albocristatus cassini*) is known by the natives to follow habitually bands of monkeys, an association from which the birds derive considerable benefit in that the monkeys, as they travel through the trees, drive insects from concealment into the open where they may be preyed upon by the waiting and perennially ravenous hornbills. Dr. Chapin, in his text, refers as well to other known examples of this habit, such as that of a Bornean drongo (*Dissemurus paradiseus*) which follows bands of macaques (reported by Ridley) and of another drongo (*Dicruropsis leucops*) which accompanies the Celebes Crested "Ape" (*Cynopithecus niger*) in the same manner (described by Raven).

In the mountain forests of the Zamboanga Peninsula, Mindanao, Philippine Islands, the author found that the Black-mantled Fairy Bluebird (*Irena cyanogastra melanochlamys*) accompanies troops of the long-tailed or crab-eating macaque (*Macaca irus*) with apparently the same end in view. During the months of August, September and October, 1945, this handsome bird was observed regularly and, although it was seldom to be seen associating with others of its kind, the species was almost invariably encountered singly and in the company of a band of macaques. This habit is so well known by the human inhabitants of the region that their name for the species means "sentinel of the monkeys," and they ascribe to it the duties of a guard. It is far more probable that it is the bird which benefits from the association rather than the monkeys, and in a fashion similar to that of the hornbill and the drongos.—KEN STOTT, JR., *San Diego Zoo. San Diego, California.*

Wild Turkey anting.—Sometime someone will compile a new bibliography of anting. Then reference to the following note by Dallas Lore Sharp ('Beyond the Pasture Bars,' p. 65, New York, 1914) should be welcome. "When her brood begins to lag and pine, the wild mother knows, and leading them to some old ant-hill, she gives them a sousing dust-bath. The vermin hate the odor of the ant-scented dust, and after a series of these baths disappear."—W. L. MCATEE, *Fish and Wildlife Service, Chicago, Illinois.*

Notes on the occurrence of birds in the Gulf of Mexico.—In view of the present discussion of the validity of the trans-gulf migration route as a regular flyway of North American birds, the following general observations may be of interest. I spent the period from March 15 to August 20, 1943, as Armed Guard Commander on the U. S. S. Castana, which plied between Norfolk, Virginia, and ports on the coasts of Texas and Florida. Naval directives prohibited the keeping of diaries during wartime on sea-going vessels, so that it was not possible to keep exact notes on when and where birds were observed in the Gulf of Mexico. However, even generalized notes may be of value to the discussion.

On every voyage through the Gulf during the period, a number of birds flew about

the vessel or landed on it. Many of them were obviously migrants, appearing from the south over the water and proceeding northward to the mainland. The greatest number were always seen as we passed the mouth of the Mississippi River, often halfway between Yucatán and the delta. Although regularly seen, the total number of birds was small. Usually about a dozen land birds might be seen in one day, although Barn Swallows sometimes appeared in flocks of several hundred. One morning in May a considerable flight of various warblers passed the ship for about an hour, most of them too far away to be identified. Occasionally Laughing Gulls, Ring-billed Gulls and terns appeared, usually in unsettled weather, but their status as migrants is doubtful.

Compared with the tremendous surge of land and water birds up the coast of Texas in migration, when flocks numbering up to tens of thousands may be seen at one time following the shore line, the migration across the Gulf is not spectacular. It is certainly accurate to state that the bulk of the migration is coastal. However, the trans-gulf flyway appears to be used regularly by a limited number of birds, and is doubtless a valid route.

Among the species I recall seeing in the Gulf, ten miles or more from shore, the following can properly be considered migrants: Wood Ibis, Green Heron, Phalarope (probably Wilson's), Duck Hawk, buteos, Tree Swallows, Barn Swallows, Catbird, thrush (sp.), Eastern Bluebird, Worm-eating Warbler, Parula Warbler, Yellow Warbler, Northern Water-thrush, Chestnut-sided Warbler, Wilson's Warbler and Red-eyed Vireo. The following species seen may not have been migrants: Laughing Gull, Ring-billed Gull, Man-o'-War Bird, Royal Tern, Caspian Tern, Clapper Rail, and Blue Jay. After a severe hurricane near Houston, in July (?), four Noddy Terns and one Bridled Tern were seen 90 miles west of Tampa, Florida, resting on a floating log.—Fred Mallery Packard, *Lieutenant Commander, USNR, Corpus Christi, Texas.*

Black Vultures kill young pigs in Kentucky.—Although the propensity of the Black Vulture (*Coragyps atratus*) to attack and devour the young of domestic animals is well known and has been summarized by Bent in Life Histories of the Birds of Prey, part 1 (U. S. Nat. Mus., Bull. 167, 1937), the majority of such reports are from the deep south in Louisiana and Florida where this black robber is very plentiful. It therefore seems worth while to describe a case occurring near the northern part of its range, especially as there are no published data for Kentucky.

A sow gave birth to twelve young on April 26, 1946, at the farm of Marshall Darnell in Meade County near Rock Haven. Mr. Darnell threw the placentae over the fence and let them lie there fully exposed. When he returned to the farm at noon the next day, he was puzzled to find about twenty-five Black Vultures in the far corner of the pig yard about 100 yards from his house. As he approached, he noted that they were feeding on the day-old pigs, four of which were still alive and squealing, while the sow lay near by and made no attempt to go to their rescue. The other eight pigs were almost completely devoured except for their heads. He brought the survivors up to a small pen close to the house where they were not again molested.

I visited the farm on May 5 and examined the four surviving pigs. Their tails had been pulled out, their ears were badly chewed, and one had a large wound near the shoulder where the Black Vultures had torn away some of the flesh. The eyes of these pigs had not been injured, unlike those in several other reported attacks. It seems strange that the sow, which was ordinarily quite pugnacious, should have failed to protect her offspring.

I have attempted to learn whether such attacks are common in this part of the country. Darnell, a young veteran, had never heard of them before, but an elderly neighbor said that he had witnessed similar attacks many years ago on lambs as well as on pigs. There was also a case reported by another farmer of young pigs being killed in the same county a year ago.

It should be emphasized that all the reports agree that the culprits were Black Vultures (Carrion Crows, as the farmers usually call them).

In the present instance the presence of the placentae near by appears to have been the original attraction for the birds and it was agreed that in the future such material should be destroyed immediately.

Two other similar attacks have recently been reported in adjacent states. Roads (Wilson Bull., 48: 218, 1936) writes that near Hillsboro, Ohio, Black Vultures killed and ate every new-born lamb in one flock of sheep, and also destroyed young pigs. Sprunt (Auk, 63: 260, 1946) reports that Black Vultures attacked a lamb and "literally tore it to pieces while still alive" near Shepherdstown, West Virginia. Further evidence of the predatory tendencies of this species is furnished by McIlhenny (Auk, 56: 472, 1939) who actually observed them attack and kill a live skunk and two opossums. The statement of Hamilton (Auk, 58: 254, 1941), based on reports of a local resident that "Turkey Buzzards" kill young pigs near Fort Myers, Florida, seems almost certainly to be a case of misidentification, since many country people lump both vultures together under the term buzzard.—HARVEY B. LOVELL, *Biology Department, University of Louisville, Louisville, Kentucky.*

Black Vultures and live prey.—In General Notes, in the April, 1946, issue of 'The Auk,' Alexander Sprunt, Jr., mentioned that it is very rarely that one hears of a first-hand account of predation on living prey by the Black Vulture. I consider myself fortunate in having witnessed such a predation. While driving on a road near Deland, Florida, on March 27, 1946, I saw a gathering of about one hundred Black Vultures in a small pine grove. Upon closer observation, I saw a sow with a newly born litter. The sow seemed sick and weak, not moving at my approach. Out of the litter of ten live piglets, two showed evidences of having been attacked, presumably by the Black Vultures. One showed lacerations on its hind quarters; the other had had the flesh torn off from the middle of its back to its tail. Both piglets were quite alive. They cried loudly and continuously, but otherwise they joined the rest of the litter in running around the sow and suckling. The vultures remained near by in the trees and on the ground while three or four individuals would lunge at the piglets.—RALPH V. HAGOPIAN, *114 East 90th St., New York, N. Y.*

A Robin with one lung destroyed.—On the afternoon of April 27, 1946, while walking along Alum Creek, Columbus, Ohio, I noticed a female Robin ahead of me in the path. The actions of the bird attracted my attention, as it would not fly until I approached very closely. It finally flew and alighted on the ground about a hundred feet to one side of the path and tried to hide in the weeds. It made no attempt to fly again when I caught it. The bird died in my hand as I examined it. No evidence of injury was discovered. It seemed thin, and the bill was covered with mud. One feather in the middle of the tail was not fully developed. On dissection, the bird was found to have only one lung. The left lung was entirely gone and in its place were two large round cysts, one in the position of the lung and attached to the dorsal wall, and a smaller one attached to the side of the body cavity. The right lung appeared normal as did all of the other organs except the liver, which was enlarged and of a blue-black color.—ROBERT GOSLIN, *Department of Physiology, Ohio State University, Columbus 10, Ohio.*

A curious deformity of a pigeon's bill.—While walking through the National Zoological Park, in Washington, D. C., I observed a common pigeon that appeared to possess a deformed head. The bird was walking on the lawn, and as I approached it made a feeble attempt to fly. Since I was unable to determine the nature of the deformity, I decided to trap the bird, which would enable me to examine the specimen in the hand. By securing a length of twine I fashioned a slip knot and baited it with corn. In this manner the bird was snared.

Upon examination I found that the pigeon was not malformed, but the upper mandible had been bent backward and forced downward into the hollow of the lower mandible. The tip of the beak bulged out a bit on the lower side of the jaw; thus the mandibles of the pigeon were locked, and the bird was unable to feed. This resulted in a deplorable condition.

The bills of the Columbidae are soft and pliable and readily lend themselves to bending. The pigeon may have collided with an obstacle, causing the locked condition described.—MALCOLM DAVIS, *The National Zoological Park, Washington, D. C.*

A late nest of the Ruby-throated Hummingbird.—The late Frank Chapman, in his book on birds, speaks of an occasional humming bird's nest in Florida but not until the month of May. Early in April, Mr. John T. Semple told me of his watching a Ruby-throated Hummingbird building a nest in a live oak on his place, here in Coconut Grove. The nest is approximately thirty feet from the ground. I took some moving pictures of this nest, the first picture being about April 19, when I noticed that the mother bird, which had been sitting on the nest, flew off and came back and started feeding a young one whose bill extended above the rim of the nest. I kept returning to take moving pictures until we had a heavy rain; something over two inches fell on Friday night of May 17. I had been going there every day in the hope of seeing the young birds fly from the nest as they were quite large and seemed to spend most of their time along the rim of the nest as if too crowded down below. When I arrived at Mr. Semple's on Saturday, the 18th, I found that the nest had been washed away by the heavy downpour and there was no trace on the ground of either the nest or the young. While I was sitting there talking over the matter with Mr. and Mrs. Twomey (of the Carnegie Museum at Pittsburgh) the mother bird returned to the tree, and it was a pitiful sight to see the little bird fly up to the branch and feel with her bill the marks of where the nest had been. I was at Mr. Semple's today (March 27) and his superintendent says that the bird has not been seen since that day.—A. S. HOUGHTON, *Coconut Grove, Florida.*

The structural basis of the voice of the Flammulated Owl.—The principal call or hoot of the Flammulated Owl (*Otus flammeolus*) is strikingly low in pitch in view of the small size of the bird. Marshall (Condor, 41: 71, 1939) has determined the pitch as A to B above middle C in males. This is five or six half tones lower than the trills of the much larger western Screech Owls (*Otus asio*), which center around E^1 and F^1.

In an earlier study of the vocal apparatus of owls (Miller, Condor, 36: 204–213, 1934) it was shown that the cross-section of the air passages corresponds in general with body size. The larger the species the larger is the syringeal segment of the air passages and the longer the vibratile membranes in the walls of the syrinx which produce the tone. The longer membranes of the larger species of course vibrate more slowly and yield lower-pitched notes. These general correlations are subject to several modifying influences: (1) The enlarged syrinx, and its membranes, varies from 203 to 238 per cent of the diameter of the unmodified bronchus in males of the

ten species of the Strigidae examined. (2) In females the enlargement is less, namely 190 to 209 per cent, and this results in shorter membranes and higher-pitched notes even though body size of females is larger than that of corresponding males. (3) Tension of vibratile membranes can be controlled somewhat by muscle fibers and the pitch of the simple hoot may accordingly be altered several half tones by any one individual. (4) With general increase in size from species to species, the cross-sectional area of the bronchus increases roughly in proportion, although it lags behind; but diameter, to which the vibratile membranes correspond, increases only as twice the square root of the cross-sectional area divided by pi. Hence pitch of the hoot in the larger species is relatively high when one considers their size.

What enables the Flammulated Owl to produce so low a tone and thereby transgress these general principles governing owl notes and vocal apparatus? The syrinx of a recently taken male of this species (A. H. M. 6067) shows the following features. The bronchial diameter is 2.1 mm. and thus is but slightly less than in *Otus asio* (2.2–2.3) but greater than in the Pygmy Owl, *Glaucidium gnoma* (1.8–1.9); it is the same as in *Otus trichopsis* (Miller, Condor, 37: 288, 1935). Tracheal diameters for the same species are 3.7, 3.8–3.9, 2.5–3.0, and 3.6, respectively. Males of *O. flammeolus* weigh from 50 to 60 grams; *G. gnoma* usually weighs 60 to 65 grams; and the smaller races of *Otus asio* weigh 100 to 120 grams. Clearly *O. flammeolus* is a slender, lightly muscled owl that is not as dwarfed in basic structure and linear dimension as its weight would suggest. Its air passages certainly are little, if any, smaller than those of its near relatives in the genus *Otus*.

The length of the inner vibratile membrane in the syrinx of *O. flammeolus* is 4.5 mm. compared with 4.7 and 5.0 in males of *O. asio*, 4.4 in a male of *O. trichopsis*, and 4.2 in a female of *O. asio*. The enlarged syrinx is slightly greater proportionately than in *O. asio*—214 per cent of bronchial diameter. The Flammulated Owl therefore possesses basic equipment of surprisingly ample dimensions which should enable it to produce as low a note as that of the Screech Owl, *but no lower*.

Further inspection reveals some other peculiarities in *flammeolus*. The external and internal tympaniform membranes are much thicker than in other owls which I have studied. The interior surfaces of both are rugose and partly papillose. The thickening and turgor of the membranes must reduce the rate of vibration which otherwise is proportional to the length and tension. The situation may be comparable to that of the human voice when the larynx is swollen by infection; the sound produced then may be several tones lower than that ordinarily attained. The thickening of the syringeal membranes in *O. flammeolus* is associated with a peculiar swelling of the skin of the throat. This skin is loose and highly lymphatic, and it appears as though it often was stretched and distended. Mr. Joe T. Marshall, Jr., informs me that he has seen it bulge out at each side as the note is given.

Thus by means of thickened vibratile membranes, coupled, we may presume, with a maximum of neuromotor control, this owl is able to attain its remarkably low hoot. The hoot is of low intensity as would be necessarily true when it is produced by thickened, loose membranes, and it is typically somewhat hoarse in quality. Perhaps partly to compensate for low intensity there is what seems to be a special resonating device in the throat. In short, several structural modifications seem to have taken place so as to make the calling of this small owl as impressive as possible.

Two other peculiarities of the syrinx of this species I am unable to relate definitely to function. The cartilaginous half-rings of the syrinx are heavily enclosed at their free ends in dense fibrous connective tissue. As a consequence, the syrinx is especially rigid anterior to the external tympaniform membrane. Also, there are more

rings involved in the syrinx than in any other species thus far studied. The intrinsic muscles attach to the ninth bronchial ring on both sides, whereas they attach to the seventh or eighth rings in other members of *Otus* and on still more anterior rings in several other species of owls.—ALDEN H. MILLER, *Museum of Vertebrate Zoology, Berkeley, California.*

The foot action of swimming ducks.—It was with extreme interest that I read Allan Brooks's account of "The under-water action of diving ducks" (Auk, 62: 517–523, 1945), and of the manner in which the alula is fully extended while beneath the surface. Brooks's figures in this paper also show, I think, an interesting action of the feet, but to this he did not call attention. Some recent observations of my own prompt me to offer a brief discussion of this subject, which has received but little attention in the literature.

There are two chief methods of propulsion through the water. One employs a direct thrust, as when rowing, swimming by the breast stroke, and when a duck is paddling along the surface of the water. It is economical of effort at low speed, but the possible rate of progression is definitely limited by the celerity with which the stroke can be made, minus (in the case of submerged feet) the retarding effect of the recovery stroke. The second method of propulsion through the water employs an oblique thrust, as effected by the screw of a steamer, a sculling oar, the feet in the Australian crawl style of swimming, and in swimming by whales, seals and sea lions. This method is efficient for two chief reasons: One is that the propulsive stroke is oblique, and thus it is theoretically possible to progress at greater speed than the rate at which the stroke is made. The other reason is that there is no stroke made purely for recovery, with consequent deceleration, but forward propulsion is effected by all movements of the appendages, which are in the transverse plane, either from side to side (as in pinnipeds, fish, a sculling oar), or up and down (as in whales), but never forward and back.

Until recently I had never had an opportunity actually to see the way in which ducks swim under water. I have seen penguins, a grebe or two, and a loon, and knew that the first of these with their wings, and at least most pygopodes with the bizarre placement of their legs and feet, employ the oblique or sculling method of swimming. With legs held to the side, the feet are waved up and down, "feathered" at each thrust. In some genera the wings are also used under water, but I have seen this only in the case of a cormorant.

I had assumed that ducks could not employ the sculling method of swimming, at least with any degree of efficiency, because their legs have not the same angle or position of articulation as in grebes and loons.

While living on a schooner during the past winter (1946), I spent two weeks in January moored at Eau Gallie, Florida. Among the many Lesser Scaups (*Aythya affinis*) in the neighborhood, some 30 individuals had become sufficiently tame to take food offered them from a distance of four or five feet. Bits of bread thrown would bring them scuttering along the surface or paddling at a great rate. When a piece of bread too large to be eaten at once was thrown, Laughing Gulls (*Larus atricilla*) usually swooped upon the duck that had caught it, which sent the duck beneath the surface, and away it went, legs to the side, sculling along grebe-wise at a speed that would be hardly possible for it to attain while paddling at the surface. Every action could be seen in the clear water. The transition from one method of swimming to the other was abrupt and invariable.

Brooks's figures (*loc. cit.*) suggest that his ducks were employing this same method of swimming by a sculling action of the feet while submerged. Accordingly it seems

logical to presume that although ducks always use the direct thrust or paddling method of swimming while on the surface, the diving ducks, at least, abruptly change to the oblique thrust or sculling method of swimming while beneath the surface.—A. BRAZIER HOWELL, *Bucksport, Maine.*

Nesting of Chestnut-sided Warbler.—This study of the nesting of a Chestnut-sided Warbler (*Dendroica pensylvanica*) was made at Oneonta, N. Y., in the upper Susquehanna valley, on June 13 to July 7, 1944. The nest was located in a wooded park area where the chief species of plants were hickory, elm, and birch, with a heavy interspersion of the herbaceous plants of this region at 1350 feet altitude.

The nest was found when the female was seen with nesting material in her beak on June 13. Apparently the nest was about finished for on this date it contained a cowbird egg which I removed. June 14 at 5:00 A. M. the female entered the nest, picked here and there at the nesting material as she turned around, and then left the nest to return with a piece of grass at 5:02. This time she remained until I left the site at 5:06. When I examined the nest at 3:30 P. M. it contained no egg.

On June 19 there were four warbler eggs in the nest. Since there were none at 3:30, June 14, she probably laid them at daily intervals. On June 20 she allowed me to touch her back before she left the four eggs and the nest in which she was well concealed.

While incubating, the female usually faced the northwest and when the male approached would sometimes leave when the male was within three or four feet of the nest. He usually sang as he approached. While the male seemed to sing from very definite positions during the nest-building period he now sang from a variety of perches. During the last three days of incubation the male sang less often. Once I saw him feed the female. When alarmed, the female raised her body in the nest and erected her head-feathers.

On June 29 at 5:50 A. M. I heard a crackling sound from the nest site which proved to be from the female eating an egg shell. When the nest was examined there were two young hatched. The female left at 6:42 and returned at 6:45 with food. When she offered food she made a coaxing noise. The male was singing two kinds of songs in the territory at this time. On June 30 between 4:50 and 6:06 the male fed the young twice. Each time the female fed she hovered from two to five minutes. At 5:57 on June 30, the last egg had not hatched but I held it to my ear and heard a faint ticking sound. At 6:02 the female returned, pecked at something in the nest, waited on the edge of the nest, and at 6:04 flew away with egg shell. I examined the nest again and found the last young one out of the shell. Thus, the last egg hatched in these five minutes and I believe the female assisted in the process.

A record of the feeding of the young by the two parent birds is given in the following table.

Date	*Length of observation*	*Times male fed*	*Times female fed*
6/30	75 Min.	2	5
7/3	55 Min.	4	7
7/4	30 Min.	1	1
7/5	32 Min.	1	2
7/6	65 Min.	11	10
7/7	30 Min.	3	2
Total	287 Min.	22	27

This record shows that the young were fed 49 times in 287 minutes, an average of every 5.85 minutes (with four young in the nest).

The female continued to hover the young until they were six days of age and possibly at times after that. The young left the nest between July 8 and 10. One of the young was seen being fed by the female after they left the nest. I noticed that many caterpillars and moths were amongst the food given the young. These were garnered largely from bushes and lower leaves of trees although sometimes food was sought from higher elevations in the trees. My observations indicate that the male ceased singing entirely when the young hatched and his feeding duties began.

For reading and giving helpful suggestions concerning this manuscript I wish to thank Dr. R. A. Johnson, State Teachers College, Oneonta, N. Y.—DOROTHY SAWYER, *Unadilla, New York.*

Double-crested Cormorant nesting in New York.—On June 20, 1945, we found a colony of Double-crested Cormorants (*Phalacrocorax auritus auritus*) nesting on Gull Island, a small island in eastern Lake Ontario about four miles distant from Henderson Harbor, Jefferson County. There were fourteen nests in elm and willow trees, all of which were at least fifteen feet from the ground. Some were complete, others in various stages of construction. The completed nests contained from one to four eggs. Sixteen birds gathered in a loose flock off the island while we examined the nests. An old resident of Henderson Harbor, Mr. William Stevens, who has known the species since early boyhood, states that this is the first time in 75 years of his memory that cormorants have nested in the region.

As far as can be determined this constitutes the first authentic record of the Double-crested Cormorant nesting in New York. Eaton (Birds of New York, 1: 171, 1910) classes the species as an uncommon migrant on the Great Lakes, but competent observers do not regard this cormorant as an uncommon non-breeding bird on eastern Lake Ontario today.—H. L. KUTZ, *Pittman-Robertson Wildlife Restoration Project 20-R, New York Conservation Department, Chaumont* AND DAVID G. ALLEN, *208 Kline Road, Ithaca, New York.*

The Ruff in Connecticut.—On May 25, 1946, Gilbert Waldbauer, Robert Braun and I were looking over the numerous shore birds in an area known as Great Marsh in Westport, Connecticut. In the midst of a flock of Turnstones, Black-bellied Plovers and Semipalmated Sandpipers there suddenly appeared a rather large black-colored bird that we knew immediately was something new. It proved to be an adult male Ruff (*Philomachus pugnax*) and, judging by descriptions, about the blackest that an individual of this variable species can be. We watched it for a considerable time, in excellent light conditions and from a distance of about seventy-five feet, using prism glasses to observe all the details.

The head, neck and ruff, breast and upper back were entirely black with a beautiful purple sheen. The wings were brownish with white edgings to the feathers. The lower under parts were white, and there were white markings on the lower back. The bill and bare space on the face were pinkish, and the legs salmon color, or pale orange. When the bird finally flew, the white spots on either side of the upper tail-coverts, with a narrow dark line between them, were clearly visible.

On May 30, 1946, I again visited this area, in the company of Elting Arnold and Paul Baker. As I was showing them the place where the Ruff had been, we were astonished to find it there again in practically the same spot. It was again in the company of other shore birds, including this time several Red-backed Sandpipers. As this species is not only variable in its plumage, but also in the bill and leg colors

(Buturlin, Auk, 45: 415, 1928), there is little doubt that this was the same bird as before. In detailed observation it tallied in every particular with the previous observation.

I believe that this is the first report of this species in Connecticut.—ARETAS A. SAUNDERS, *361 Crestwood Road, Fairfield, Connecticut.*

Bobolink on the Gulf of Mexico.—On May 4, 1946, the writer and Aquatic Biologist, Joseph E. King of the New Orleans office of the United States Fish and Wildlife Service, were on a shrimp trawler in the Gulf of Mexico. We were 30 miles from the nearest point of land and 20 miles west of Trinity Shoals when our attention was attracted by the strange behavior of several small song birds, particularly that of a Bobolink.

The Bobolink first appeared at the stern of the vessel, its wings beating rather feebly as it approached. It rested on the rigging of the ship for a moment but soon took off again to flutter weakly around the vessel. It suddenly landed in the water alongside and lay with wings outstretched for a moment. Then, much to my surprise, at least, it lifted itself from the water and flew another circle or two around the ship. Again it landed in the water and again it took off after a moment or two. This time, however, its flight was noticeably weaker and it soon dropped on the water. While we watched, it leaped clear of the waves a few more times, but soon reached the stage of exhaustion and wetness where it gave up and allowed itself to become thoroughly soaked. There was no question but that the bird eventually drowned.

Similar behavior was noted in several small warblers, a Redstart, and a Wood Thrush. Even though the weather was fair with only a mild breeze, the birds appeared to be confused and nearly exhausted. Several Barn Swallows that were seen appeared to be faring much better, and a large butterfly of the monarch type was still flying strongly when last seen.

The observation indicated that, even in good spring weather, the Gulf of Mexico claims many migratory song birds.—FRANK DUFRESNE, *Chief, Division of Information, United States Fish and Wildlife Service.*

Occurrence of the White-eyed Vireo in Canada.—In 1938 I took a White-eyed Vireo (*Vireo griseus*), at Toronto, Ontario, and resultant research into the occurrence of the species in Canada brought to light some interesting data, including two apparently unpublished records for Ontario. As far as I have been able to discover, there are only six Canadian records for this vireo and, since only three of these have previously been published, it seems worth while to recapitulate the Canadian occurrences.

The first Canadian specimen was taken in "mid October," 1890, by W. L. Kells, at Listowel, Ontario. This record was published in the 'Transactions of the Royal Canadian Institute' for 1891–1892. The sex of the specimen, its disposal and present whereabouts, are unknown to me.

The next record is of a bird of unreported sex which was collected by W. D. Hobson at Woodstock, Ontario, on April 25, 1902. This specimen is mentioned in the 'Vertebrates of Ontario' by C. W. Nash, published in 1908. The skin apparently is still in the Hobson collection at Woodstock.

The third specimen was taken by Howard Skales at Mount Forest, Ontario, on September 28, 1902. This skin is now in the collection of the Royal Ontario Museum of Zoology at Toronto. The data with the specimen are rather incomplete and the sex of the bird is, again, not given. A report on this record was made by A. B. Klugh in the 'Ontario Natural Science Bulletin' for 1905.

The fourth and fifth specimens were collected by the late W. E. Saunders at Point Pelee, Ontario, on May 5, 1913, and April 29, 1916. Both birds were males and are noted as having been taken while in song. The present whereabouts of the skins is not known to me and there is no indication as to their disposal in Saunders's original notes. These notes, from which the above information has been taken, are now in the possession of the Royal Ontario Museum.

The most recent specimen was taken at Ashbridges Bay, Toronto, Ontario. The bird was first observed on April 27, 1938, by J. M. and D. H. Speirs and H. Barnett. Subsequently it was seen by Dr. R. M. Saunders and J. L. Baillie, Jr., as well as by many others. I found the bird, unable to fly, on April 29, and captured it. The specimen, a female, is now in the National Museum collection at Ottawa.—FARLEY MOWAT, *Richmond Hill, Ontario.*

Botteri's Sparrow in Arizona.—The Botteri's Sparrow (*Aimophila botterii botterii*) was found in summer in southeastern Arizona by such early ornithologists as Henshaw, Stephens, and Rhoads, in territory from Oracle and the Altar Valley in Pima County on the north and west, to the Sulphur Springs Valley in Cochise County on the north and east, and south to the Mexican boundary. The latest Nineteenth Century report from the state was by Rhoads (Proc. Acad, Nat. Sci. Phila.: 121, 1892). Two specimens were taken by Breninger, July 17, 1903, at Fairbank, Cochise County (specimens in Chicago Museum of Natural History). After 1903 the bird apparently disappeared from the state; it was not found in Arizona between 1903 and 1932, despite the occasional presence in its former range of a number of ornithologists. The bird's Arizona range was reported in the Fourth Edition of the A. O. U. Check-List (1931) as "Southern Arizona (formerly only?)"; and by R. T. Peterson in "A Field Guide to Western Birds" (1941) as "formerly se. Ariz."

The first recent evidence that Botteri's Sparrow can again be considered an Arizona bird is found in a report by Cottam and Knappen (Auk, 56: 166, 1939), who give stomach contents of two specimens taken "five miles southeast of Fort Huachuca" in Cochise County, June 20 and July 13, 1932, respectively, by Alexander Walker. They did not report the current location of the specimens.

The writer, then, has considered it unusually good fortune to rediscover at least a part of the bird's Arizona range during 1939 and 1940. It was first met with June 29, 1939, along the Babocomari River a few miles east of Elgin in Santa Cruz County, when a singing male was collected. A few days later, July 9, four males were seen singing, one of which was collected, in the southern end of the Sulphur Springs Valley, a few miles east of Lowell; the birds were still singing here August 6, 1939, but were not seen on later dates.

During 1940, the first bird was detected (and taken) May 23, along the Babocomari River east of Elgin; it was a male with testes greatly enlarged. On June 5, a singing male was seen a few miles east of Lowell. On June 19, one was seen about seven miles northwest of Fort Huachuca, and a singing male was taken about five miles northwest of Fort Huachuca. This bird's testes were greatly enlarged. On July 26, a singing male with enlarged testes was taken on the Page Ranch about eight miles west of Oracle.

On August 7, 1940, the latest date I have observed the species in the state, I found a number of Botteri's Sparrows in the Fort-Huachuca-Elgin area. A male and female were observed about seven miles northwest of Fort Huachuca; the female "chipped" and flitted about nervously as though a nest were in the vicinity. She was collected and proved to have a large brood patch and an enlarged oviduct and ovary, the largest egg in the ovary measuring 1.5 mm. The male appeared comparatively unperturbed

by my presence, and his only singing was in half-hearted attempts. Later in the day, a mile or so farther northwest, I saw another such couple plus two singing males. One of the males was taken, the testes of which were greatly enlarged. Still later, I saw two additional individuals in an alfalfa-Johnson grass field at the Brophy Ranch headquarters along the Babocomari River east of Elgin.

There is at present no positive evidence that Botteri's Sparrow nests in Arizona. The bulk of Arizona records fall during the months of June, July, and August (extremes, May 17 and October 7), which argues that the bird does breed in Arizona. There is a set of eggs taken May 24, 1891, in the "San Rafello Valley" (probably San Rafael Valley in Santa Cruz County) by A. H. Marshall, "♀ shot" (American Museum of Natural History, New York City), in grass in juniper association. This seems too early for five eggs, and is probably a misidentification, as all available data indicate the species is a very late migrant. On the other hand, the supposed Cassin's Sparrow (*Aimophila cassinii*) eggs found by O. W. Howard (Swarth, Pacific Coast Avifauna No. 4: 43, 1904) in the San Pedro Valley may well have been *botterii*, since Phillips (Auk, 61: 409–412, 1944) has introduced strong evidence to show that Cassin's Sparrow is a post-breeding visitor to Arizona. It is hoped that some ornithologist will soon have the opportunity to establish Botteri's Sparrow conclusively as a breeding bird of the state.

Nearly all Botteri's Sparrows noted were inhabiting stands of sacaton (*Sporobolus wrightii*), a tall grass which occurs along the Babocomari River and in parts of the southern end of the Sulphur Springs Valley. Singing perches used most frequently were mesquite (*Prosopis juliflora*), catclaw (*Acacia Greggii*), and whitethorn (*Acacia constricta*), which shrubs occur with the sacaton stands or on their borders. In some instances, the birds were occupying swales of sand dropseed (*Sporobolus cryptandrus*), intermingled with mesquite and catclaw.

My thanks are due to Allan R. Phillips of the Museum of Northern Arizona, Flagstaff, for contributing data otherwise unavailable to me, and for offering valuable comments during preparation of this paper.—GALE MONSON, *P. O. Box 1717, Parker, Arizona.*

The White-faced Petrel again off Massachusetts.—On the afternoon of May 3, 1946, when returning from Europe on the steamer 'Wooster Victory' I noticed two petrels skimming low over the water that were white beneath, the white being conspicuous as they banked and turned. The locality was on lat. 42° N.; at noon the steamer was 515 miles from New York, but by the time I saw the birds we had probably covered about one hundred miles. As the White-faced Petrel (*Pelagodroma marina*) is the only species with the entire under parts white there can be little doubt that this was the species observed.—CARROLL E. WOOD, JR., *434 High Street, Salem, Virginia.*

Red-bellied snake in Ruffed Grouse crop.—While doing analysis work recently as food habits research biologist with the Wisconsin Conservation Department, Harry Anderson found a small specimen of the red-bellied snake (*Storeria occipitomaculata*) in the crop of a Ruffed Grouse (*Bonasa umbellus umbellus*). The grouse had been collected in Taylor County, Wisconsin, in October, 1942. This unusual record was of double interest when no specimen record of this snake could be found for this Wisconsin county.—WALTER E. SCOTT, *Wisconsin Conservation Department, Madison, Wisconsin.*

Early fall migration of the Purple Martin.—A rather distinct lack of specific dates for the first departure of the Purple Martin (*Progne subis subis*) from its summer

nesting grounds appears to exist in the literature. There are ample data on the *latest* date it has been seen in many localities, and while it is well understood that the bird is an early migrant both in spring and fall, difficulty is encountered in exact times of the *beginning* of the autumnal movement. Therefore, the following should be of interest.

On June 21, 1946, the writer was returning up the Florida Keys from Key West. Late in the afternoon, on the eastern end of Plantation Key and the western end of Key Largo, a surprising concentration of martins was observed on the telephone wires bordering the Overseas Highway. In a distance of about half a mile, three large flocks were seen on the wires, with numbers of birds wheeling and circling about the resting individuals, and others coming in from the northern segment of sky over Florida Bay. The total number could hardly have been less than five hundred.

A considerable preponderance of immature birds was noted, but there were adults among them, both male and female. The martin does not nest in the Keys, nor indeed, anywhere at the very southern tip of mainland Florida. That this was a migratory movement seems beyond question, but the date is surprising in view of the fact that it was, by the calendar, the first day of "official" summer, and exceedingly early to witness the southward migration of even such an early traveller as the martin. None the less, there they were.

In the Charleston, S. C. area, migration begins in July, varying from the middle to the end of the month in regard to resident nesting birds, but movement is noted earlier than that at times, and concerns birds which have nested to the north of South Carolina. Charleston is some 700 miles by road from Key Largo and the migratory (?) birds seen there were about one month ahead of those of this section which usually depart in late July!

F. C. Lincoln in his 'Migration of American Birds,' page 70, says of this species that " . . . it may be noted that Purple Martins have been known to arrive in Florida in late January and the northward movement may continue so that late arrivals are still coming in during the first week in June. With some birds the migration is so prolonged that the earlier arrivals in the southern part of the breeding range will have completed nesting while others of the same species are still on their way north." Certainly, this would appear to be the case in this instance. Here were birds which must have been starting their autumnal flight while many others far to the northward had not yet finished nesting. More dates on this first departure of martins from nesting areas are needed, but so few of such appear to be listed that this may constitute at least a beginning.—ALEXANDER SPRUNT, JR., *National Audubon Society, Charleston, South Carolina.*

The Bridled Tern again in south Florida waters.—On October 2, 1940, the writer was fortunate enough to see, capture, band, and release a Bridled Tern (*Sterna anaethetus melanoptera*) in Florida Bay, an account of which appeared in The Auk, 58: 259, 1941. Apparently it was the fourth record for this species in the state.

On June 21, 1946, when returning from the Dry Tortugas on the National Park Service boat, the writer was called from below by his son, Alexander Sprunt, 4th, with the statement that a Bridled Tern was following close in the wake. No time was lost in arriving at the stern of the boat! The bird was flying a few yards off the stern, wheeled several times and presented excellent views of its back, under parts and profile. The whitish collar separating the black of the crown and that of the back was as plainly visible as though marked with paint. The bird continued to follow for a few minutes, then dropped astern. Since we had just completed a popu-

lation count of Sooty Terns at the Tortugas, the different aspect of this bird was most obvious.

The position of the boat at the time was about a mile and a half southwest of the whistling buoy on New Ground Shoal (between Marquesas Keys and the Dry Tortugas) and distant about 25 miles east of the latter group. This appears to be the fifth appearance of this tropical bird in the south Florida region.—ALEXANDER SPRUNT, JR., *National Audubon Society, Charleston, South Carolina.*

Evening Grosbeak in eastern Virginia.—On May 5, 1946, I saw about fifteen Evening Grosbeaks in a grove composed principally of large beech trees with a scattering growth of smaller trees and shrubs. The location was on Gordon's Creek ten miles from Williamsburg, Virginia. This is the first record I have for this state although they may have been previously reported, and the date of their occurrence is of particular interest. I visited the same locality on May 7 and 8 and found the birds still there, and on the latter date, I collected a male specimen. The sexes seemed to be about equally divided but they showed no sign of being paired and moved about as a compact flock. They were found in the middle and lower foliage of the trees and, at times, all of them would be on the ground where they may have been feeding on beech nuts of which there was a plentiful supply.—F. M. JONES, *Cologne, Virginia.*

Late Evening Grosbeaks on Long Island, New York.—During the winter of 1945–1946, a flock of Eastern Evening Grosbeaks, *Hesperiphona vespertina vespertina* (W. Cooper), came daily to the Baldwin Bird Club feeding station at the library grounds in Baldwin, L. I., N. Y. The flock, at its maximum, numbered more than eighty birds. The grosbeaks were first seen on December 24, 1945. On Easter, April 21, 1946, 33 birds were still at the feeding station. On Sunday, May 12, John Bull and George Komorowski, of The Linnean Society, recorded one male and four females at the feeding station. The next day, May 13, Mrs. Teale saw one male and three females and on Wednesday, May 15, Weston Fowler, Conservation Chairman of the Baldwin Bird Club, saw one female, the last bird observed. This date exceeds by 19 days the latest previous record for Eastern Evening Grosbeaks on Long Island and by nine days, the record for the New York City region as recorded on page 438 in Allan D. Cruickshank's 'Birds Around New York City.'—EDWIN WAY TEALE, *Baldwin, L. I., New York.*

Curlew flight through southwestern Oklahoma.—That a considerable number of Long-billed Curlews (*Numenius americanus americanus*) moved through southwestern Oklahoma in the spring of 1946 seems apparent from observations of personnel of the Wichita Mountains Wildlife Refuge, Comanche County, Oklahoma.

Approximately 50 appeared on the Wichita Refuge between March 23 and April 10; the last were observed April 20. This curlew is very rare on the refuge, having been reported but once previously, when a few were seen in early April, 1943. Roy T. Ballard, refuge patrolman, observed 1,500 in the vicinity of Tipton, Oklahoma, March 31, and also saw between 700 and 800 in an 80-acre grainfield on the L. H. Lindsey farm, three miles north of Tipton, on the same date. It is the conclusion of Tipton residents that the species was slightly more numerous during the 1946 spring flight than in previous years. Several flocks of 20 or 30 birds were also reported from the Indiahoma (Oklahoma) area to the writer.

Four birds were found along roadsides, apparently victims of passing cars. The crop of one which was examined contained a number of small cutworms, a few striped

WILLIAMS: ARCTIC TERN IN ALASKA: (*Upper*) SOUTH SAWYER GLACIER, TRACY ARM. ISLAND IN LEFT FOREGROUND WHERE TERNS WERE NESTING POINTS TOWARD FALLING ICE IN THE BACKGROUND. (*Lower*) NORTH SAWYER GLACIER, LOOKING NORTH FROM ISLAND.

grubs and a large amount of green grass and alfalfa leaves. The bill of this specimen measured 7⅛ inches in length.—Ernest J. Greenwalt, *Wichita Mts. Wildlife Refuge, Cache, Oklahoma.*

Cattle Egret in Surinam, Dutch Guiana.—While watching birds on March 10, 1946, near Nieuw Nickerie, Surinam, I found a number of herons assembled in a swamp behind the small fringe of wood which borders the coast between the rivers Corantijn and Nickerie. Beside Egrets (*Casmerodius albus*), always very common in the rice fields bordering this swamp on the land side, there were several Snowy Egrets (*Leucophoyx thula*), Little Blue Herons (*Florida caerulea*) and Louisiana Herons (*Hydranassa tricolor*). Among a group of Snowy Egrets, a small white heron of just the same size drew my attention at a distance by having an orange yellow bill instead of a black one. Happily I could approach this group of birds until I was quite near, as herons in this region are, as a rule, very tame. To my great astonishment I saw that it was a Cattle Egret (*Bubulcus ibis*). It was of just the same size as the Snowy Egrets, its bill was orange-yellow, its legs and feet dark yellow, it had a small buffish tuft on its crown and buff feathers on the mantle. After I flushed the bird, these buff feathers on crown and mantle were very conspicuous when it settled again in a shrub. As several herons of different species were feeding in its company, I could easily compare these field marks. Nevertheless I very much regretted in having no gun with me at that time so that I was not able to collect the bird and that I now have to content myself by giving this interesting observation as a sight record. This seems to be the first record for Surinam and the third one for South America; it was recorded before from British Guiana (Auk, 56: 470, 1939) and Venezuela (Auk, 61: 656, 1944). Now that three birds have been recorded in different years and at widely separated localities, it seems unlikely that they were escaped captive birds.—Fr. Haverschmidt, *14 Waterkant, Paramaribo, Surinam.*

Pintail in Surinam, Dutch Guiana.—Among a few bird skins from Surinam assembled by Dr. D. C. Geyskes of the Agricultural Experiment Station at Paramaribo, I found a young male Pintail (*Anas acuta tzitzihoa*). It was shot by a local hunter early in January, 1946, near Nieuw Nickerie, District Nickerie, Surinam. Never having seen this kind of duck in that region, he took it to the District Commissioner who forwarded the bird, which was only wing-tipped, to Dr. Geyskes who made a skin of it. I believe this to be the first record for Surinam and to be the southernmost record for South America.—Fr. Haverschmidt, *14 Waterkant, Paramaribo, Surinam.*

Notes on the Arctic Tern in Alexander Archipelago, Southeastern Alaska (Plate 6).—On June 23, 1945, Edward L. Kiethahn and I visited a small colony of *Sterna paradisaea* on a tiny island in the fresh-water lake in front of the 'dead' Mendenhall Glacier which is located about 12 miles northwest of Juneau, Alaska.

The half-acre island is composed of gravel left by the glacier or pushed up by the action of the lake. The surface was carpeted with several species of mosses and lichens. A few small willows and alders were found along the high north side of the island which rose to an elevation of near five feet above the lake surface.

The terns were noted in flight over Mendenhall Lake, making detours, quartering and diving in their search for food. At this season of the year, salmon two to three inches in length could be found in the lake and the streams which feed this body of water. The adults flushed when we were about a quarter of a mile from the island and immediately filled the air above the island in wild, yet graceful, dignified and

easy flight. Upon our landing, the adults darted with arrow-like onslaughts at our heads.

Twenty-three nests were found containing half-grown young to two and three eggs well darkened by incubation. The cup was a simple pit in the sand surrounded by a ring of mosses. These cups could be found here and there about the island as evidence that some of the young had left the nests. Only nests containing young or eggs were counted.

There were no signs of predation upon these terns and the only other nesting birds were a pair of Short-billed Gulls (*Larus canus brachyrhynchus*) with two half-grown young which were banded along with several of the larger young terns. The bodies of three long-dead adult terns were found, and near a number of the cups could be found the bodies of downy young. There were no indications as to the cause of the mortalities, whether it was disease or weather.

On July 15, 1945, with an excursion party of 24, I visited a small ten-acre island at the end of the Tracy Arm, 65 miles south of Juneau, Alaska, where the Sawyer Glaciers enter the sea. The Sawyer Glaciers are known as active or 'alive' glaciers and are divided into the North and South Sawyer. The small island lies in the sea between these two huge masses of ice. The elevation of the island is well over a hundred feet and composed almost entirely of solid masses of igneous rocks. Mosses and lichens had gained a foothold in the cracks, scratches and crevices of the rocks and the higher portions were thickly covered with small cottonwoods, willows, spruce and alders intermixed with salmonberry and blueberry bushes.

A few Arctic Terns and Short-billed Gulls were flying above the island and fishing over the surrounding sea. On a finger or arm extending out from the main island towards the South Sawyer Glacier, I found the nesting area of the terns. This finger had an elevation of some twenty-odd feet and was carpeted with mosses and lichens. The 45 nests found on the crest of the ice-worn rock and surrounded by rings of mosses, contained two eggs; not a single nest containing more or fewer eggs was found, and to all appearances the eggs were fresh or early in the stage of incubation. A complete count of the colony was not made as a quarter of a mile of the glacier fell into the sea, forcing ice out towards our waiting craft. We had to leave the island to prevent being marooned by the ice.

Several pairs of Short-billed Gulls were observed on the island. Their young could take to the wing or, if unable to fly, were protected from sight by the foliage. No nest sites were found.

About a mile from the island on the sheer south wall of Tracy Arm was a huge colony of Glaucous-winged Gulls (*Larus glaucescens*) numbering in the neighborhood of 250 pairs. These large gulls had their nests among the scrub alders and brush on the almost perpendicular rock wall of the mainland. No attempts were made to land because of the sheer nature of the wall with no place to beach a skiff.

Bailey (Auk, 44: 1–23, 1927) reported a large colony of Arctic Terns nesting on the moraine in front of the 'dead' Norris Glacier, near the Taku Glacier south of Juneau, Alaska. He stated that at least a thousand pairs were using the debris-covered flats and that the season was well advanced by June 26–28. Arctic Terns are late arrivals along the Gastineau Channel; the first were recorded May 2, 1945, near Douglas Island.—Ralph B. Williams, *Juneau, Alaska.*

Western Grebe in Massachusetts.—In the 'Auk' for April, 1939, the writer reported observation of a Western Grebe, *Aechmophorus occidentalis*, at Martha's Vineyard, Massachusetts. On December 2, 1945, following a storm notable in the

annals of the Weather Bureau, I walked several miles along the coast at Rockport, Massachusetts. Tremendous waves were pounding in and, although the day was one of brilliant sunshine, the air was filled with an invisible mist which constantly drenched my field-glasses. Some 25 Black Guillemots, *Cepphus grylle grylle*, were scattered along the shore, being in many instances only a few yards from the rocks. To see more than three of this species from the mainland in one day is a rare event. Perhaps 40 American Eiders, *Somateria mollissima dresseri*, were flying aimlessly back and forth or resting near shore. While this species is found commonly inshore in numbers on Cape Cod, but few birds winter off Rockport and the species there stays well offshore. More rare yet was an Atlantic Puffin, *Fratercula arctica arctica*, a bird almost never seen from the mainland in Massachusetts. Apparently deciding the worst was over the bird headed far out to sea.

Folly Cove, so named because it faces practically due north and affords no shelter to any unsuspecting sailor, was a set-piece for the study of waterfowl. In this tiny basin, which could not contain a large schooner, were two White-winged Scoters, *Melanitta fusca deglandi;* a drake American Eider; two Common Loons, *Gavia immer immer;* a Red-throated Loon, *Gavia stellata;* a Horned Grebe, *Colymbus auritus;* three Holboell's Grebes, *Colymbus grisegena holböllii;* and a Western Grebe.

Mr. Robert Walcott, President of the Massachusetts Audubon Society, saw presumably the same Western Grebe in the general region on December 9, 1945.—WENDELL TABER, *Cambridge, Massachusetts.*

Cowbird young in western Oregon.—In late May, 1946, two females and one male Nevada Cowbird (*Molothrus ater artemisiae*) appeared in my back yard here in Eugene, Oregon. Though it is an unusual bird west of the Cascades, here in Oregon, I did not record the date.

Then about June 10, I noticed a Rusty Song Sparrow (*Melospiza melodia morphna*) feeding a youngster almost its same size only much lighter in color and gray rather than brown. My observations of this bird were rather casual, and it was not until the sparrow began bringing its ungainly youngster to a feeding tray that I really took notice of it. Then its shorter tail, much differently shaped bill, and walking rather than hopping gait became evident.

The last day on which I saw the sparrow feed the young cowbird was June 26. At that time the youngster was one-quarter again larger than its foster parent.

The bird is still about (July 9), feeding itself a good deal of the time on a tray about eight feet from our kitchen window. It seems to prefer the seeds of millet to anything else that I have put out. Although it has very completely taken over the feeding tray and spends much of its time there it does not monopolize the tray. It pretty generally ignores any other birds on the tray and because of its larger size, they seldom bother it.

In correspondence with Dr. Stanley G. Jewett, Pacific Flyway Biologist for the Fish and Wildlife Service, I learn that this is the first definite record of the cowbird breeding west of the Cascades in Oregon.—GORDON W. GULLION, *Eugene, Oregon.*

Yellow-billed Loon on Long Island, New York.—One day in June, 1930, the late Gerald H. Thayer brought to me the mandible of a bird that he had recently found on the shore of eastern Long Island. The carcass of the bird was so badly decomposed that he had made no attempt to salvage more than the fragment in question. A careful comparison of this with a variety of other skeletal material showed the bird to have been a Yellow-billed Loon (*Gavia adamsi*), and more recent reëxamination has confirmed the earlier identification.

The specimen (No. 4005, Amer. Mus. Nat. Hist.) is not quite complete, even for the mandible, since the extreme basal portion (apparently about 15 mm. in length) is broken off, but the remainder is entire. The length from the malar apex is 91 mm.; the length of the gonys, 51; the commissural outline is definitely concave; the lateral aspect of the gonydeal angle is rather evenly curved; the rhamphotheca is ivory white, darkened only at the gonydeal angle and irregularly basad. These characters all show perfect agreement with *adamsi* and none at all with the other loons.

Unfortunately, the exact date of discovery and the precise locality were not given, but "eastern Long Island, early 1930" may be sufficient for the record, the publication of which is prompted by current work on the new edition of the A. O. U. Check-List.—JOHN T. ZIMMER, *American Museum of Natural History, New York, N. Y.*

American Knot and Red-backed Sandpiper in Vermont.—During September, 1944, water levels of Lake Champlain at Burlington, Vermont, were considerably below the official average for this period. Fairly extensive flats were thus exposed along the shore from the Burlington City sewer outlet south for about a mile to Oak Ledge. Sewage debris made attractive feeding for considerable numbers of shore birds of thirteen species including Killdeer, Pectoral Sandpiper, Ruddy Turnstone, American Knot, and Red-backed Sandpiper. These were all observed between September 8 and 27.

The Knot was a single bird in full winter plumage seen there on September 15 in company with Black-bellied Plovers. The bird was observed carefully from behind a jetty with 6 x 30 binoculars from thirty feet distant. The characteristic build, short bill, white feather edging, and whitish rump were all noted. I have been familiar with this species on Lake Ontario. So far as I have been able to determine, this is the first recorded observation of this species in the State of Vermont. Mr. Wendell P. Smith, Vermont State Ornithologist, confirms this as a first record.

The Red-backed Sandpiper was also a lone bird seen on the rocks of a stone jetty on September fifteenth. The bird was in almost full winter plumage and the characteristic decurved bill was clearly seen as the bird allowed close approach. This is apparently only the second record of this species from Vermont.

Because of the appearance of both these species along the Atlantic Coast and westward along the Great Lakes, it would seem likely that careful watch would reveal their occurrence more frequently along the shores of Lake Champlain.—GORDON M. MEADE, M.D., *Strong Memorial Hospital, Rochester, New York.*

Sabine's Gull in Minnesota.—An immature Sabine's Gull, *Xema sabini* (Sabine), was observed on October 1, 1944, at Stillwater, Minnesota, on the Saint Croix River. With 8x binoculars the bird was studied as closely as twenty-five yards (paced) at 6:20 to approximately 6:30 P. M. in good light. We stood ten feet above the water's edge, looking down upon a group of Ring-billed Gulls which fed upon bread we tossed to them. They were joined by the Sabine's Gull with its striking wing-pattern and black-tipped, forked tail; it was identified from Peterson's 'Field Guide' on the spot.

A check of the past records in the Auk indicates that each of the six specimens taken in the interior of the United States are immatures collected in October. One sight record on September 12, 1940, by Wm. H. Behle and Edwin D. McKee in Grand Canyon National Park (Auk, 60: 278, 1943) and one shot but not recovered by E. W. Nelson on April 1, 1873, on the shore of Lake Michigan (Auk 1: 41, 1884) are not identified as to age.

COLLECTED SPECIMENS RECORDED IN THE AUK

Date	*Age*	*Sex*	*Place*	*Record*
Oct. 15, 1891	Imm.	male	Burlington, Iowa	Auk 16: 86, 1899
Oct. 12, 1894	Imm.	female	Burlington, Iowa	Auk 16: 86, 1899
Oct. 3, 1909	Imm.	?	Hamilton, Kansas	Auk 31: 105, 1914
Oct. 9, 1926	Imm.	male	Fairfield County, Ohio	Auk 44: 241, 1927
Oct. 10, 1928	Imm.	male	Adams County, Colo.	Auk 54: 526, 1937
Oct. 21, 1932	Imm.	female	Grand County, Colo.	Auk 54: 526, 1937

—WM. H. LONGLEY, *334 So. Albert Street, Saint Paul 5, Minnesota.*

Correction to "Popular Subspecies."—In my note in The Auk (61: 135–136, January, 1944) the impression was inadvertently given that all of a number of local names of the *Mallards* of a late flight were heard in Missouri. That is not the case as four of the names cited: "frostybeak," "ice-breaker," "snow mallard," and "twister," were collected at Browning, Illinois, by Frederick C. Lincoln, who makes the following interesting remark: "These names are used to designate a small mallard that arrives late in the season. Hunters insist they are a different species, and I must admit that they are readily distinguishable, principally by size and erratic, cork-screw flight." The case seems to be very much like that of the Black Duck and possibly a conclusion parallel to that of most recent students of the subject may be drawn, namely, that the distinguishing characters are those associated with degree of maturity and probably do not have subspecific significance.—W. L. MCATEE, *Chicago, Illinois.*

A Coöperative Study of the White-throated Sparrow—Correction.—It has been called to our attention that two errors appear in the article entitled, 'A Coöperative Study of the White-throated Sparrow,' which was printed in the July issue of The Auk (63: 402–418, 1946). On page 413, mention is made of a White-throated Sparrow banded at Groton, Massachusetts, and later found dead in Texas. This bird was *not* a White-throat but a White-crowned Sparrow, and was *not* banded by Edwin A. Mason but by William P. Wharton.—RICHARD B. FISCHER AND GEOFFREY GILL, *Flushing, New York.*

RECENT LITERATURE

Delacour and Mayr on the Birds of the Philippines.[1]—This volume, one of the "Pacific World Series" is the first attempt to survey the rich bird life of the Philippine Archipelago since McGregor's book published in 1909 and Hachisuka's unfinished work, parts of which appeared between 1931 and 1935. It differs from both of its predecessors in that it is essentially a field manual, and it therefore has a more condensed, compressed textual style. As is to be expected from its authorship, it also reveals a great reduction in the number of genera recognized as "valid," a feature that is of relatively little significance in a field book, as the sole interest of the potential user would be to identify to species the birds observed and not first to ascertain their generic positions. On the other hand, it certainly does not interfere in any way, although the inclusion, at the end of the book, of a list of generic synonyms may conceivably cause the amateur user of the volume some needless puzzling. For the taxonomist, on the other hand, this list is a useful adjunct.

The authors inform us that although the avifauna of the Philippines has been fairly completely listed, it is otherwise the least known of the whole Pacific world. In matters of habits and local distribution, especially, are the gaps in our knowledge great, and the present volume might well become an important building block in helping observers to identify the objects of their observations and so make them available as bits of data to help fill in these gaps.

The book is divided into two main parts and an appendix, which, again, is divided into two sections. In the first part the authors briefly discuss and summarize their generalizations concerning bird geography and bird habitats in the Philippines. Excluding the Palawan group, which is rightly treated separately in the appendix, there are about 450 species of birds known from the islands, of which over two-thirds are residents and less than one-third are visitors. These birds are influenced in their distribution by three main factors, climate with its resulting pattern of plant distribution, former land connections between the islands, and proximity to neighboring land masses, such as China and Formosa, Celebes, etc. The authors find that most Philippine birds show Malaysian affinities, but some indicate closer ties with Oriental and Palaearctic elements, indicating, as is to be expected, more than one line of original invasion to account for the present avifaunal picture.

The second and larger part of the book is taken up with the systematic description of the birds themselves. Each family appears to have been "written up" by one of the two authors (the responsible initials are given after each family in the table of contents), but to have been checked by the other as well. This section is illustrated by black and white drawings of many of the birds, on the whole very well done, by E. L. Poole and A. Seidel. The text appears to have been carefully compiled with the field user in mind; it gives every indication of successfully meeting the need it was designed to serve.

The birds of the Palawan group, being predominantly Malaysian, and, more especially, Bornean, than those of the Philippines proper, are treated in Appendix A. Of 111 resident species, 43 are Malaysian, 27 Philippine, and 41 are common to both subregions. Of these 111, seven are endemic in the Palawan group, and of these seven, the affinities of five are Malaysian and of only two are Philippine.

It is a pity that the publication of this eminently usable book was delayed until after the withdrawal of most of our troops from the Philippines, as this greatly cut

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[1] DELACOUR, JEAN, AND MAYR, ERNST. 'Birds of the Philippines.' Post 8vo. pp. xv + 209, figs. 1–69, Aug. 27, 1946. The Macmillan Co., New York. Price, $3.75.

down the size of the immediate public it was designed to help. It should have a continuing usefulness, however, and will certainly be a volume to be consulted by anyone having to do with Philippine birds.—HERBERT FRIEDMANN.

Birds of Chile.[1]—This welcome volume—the first of two contemplated, is the best and most complete work of its kind that has appeared on the birds of any part of Latin America. The authors are all long-time residents of Chile and ardent bird students, and some thirty years of preparatory observation and study, in the field and in the laboratory, have made them eminently qualified to discuss the bird life of this interesting country.

The plan of the book is that of an illustrated handbook, beginning with the highest families of the Passeriformes and continuing to the Columbiformes, with local and English names, as well as the accepted scientific ones, with short descriptions of each of the Chilean subspecies, and illuminating accounts of range, song, nests and eggs, migrations and other interesting facts. Colored figures, by Mr. Goodall, are given of about one-fourth of the species, covering most of the genera found in Chile. In a number of cases where the different members of a genus or family are very similar, such as *Cinclodes*, *Muscisaxicola*, and the Columbidae, all the species are figured (in whole or in part) to facilitate direct comparison of the distinguishing characters. Two colored plates of eggs, showing those of 41 species, present all of the styles of color and markings that occur in the Chilean birds of the present volume.

In an introductory chapter there is an account of the physiography and climate of Chile, the zonal distribution of birds in that country, something regarding nomenclature, geographical variation, migration, bird topography and measurement, and the system of classification followed in the book. Throughout, the pages are illustrated further by photographs of nests, nesting sites, and terrain occupied by various species.

In the discussions of the various forms, the authors have gone to a great deal of trouble to supply for certain measurements the arithmetical mean, standard deviation, and coefficient of variation, even when the number of specimens in the sample is as low as three. The value of this feature is questionable in a book intended in considerable part for general public consumption. When the series are considerable, the figures can be of statistical value in technical studies, but they are of little use to anyone seeking to identify birds in the field. There is, however, an abundance of information that is of the greatest service in that particular, and the inclusion of the statistical figures does no harm.

The authors travelled widely over Chile in search of information with the result that many statements of previous record have had to be revised. Some species also have had to be added to the Chilean list and four forms are described as new, to be credited to one or other of the individual authors as indicated: *Xolmis pyrope fortis* Philippi and Johnson, *Tachuris rubrigastra loaensis* Philippi and Johnson, *Phloeocryptes melanops loaensis* Philippi and Goodall, and *Pteroptochos megapodius atacamae* Philippi.

The authors have set a mark which it is hoped will not only stimulate the study of birds in Chile but serve as an example for similar books about the avifaunas of other of our Latin American neighbors.—JOHN T. ZIMMER.

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[1] GOODALL, J. D.; JOHNSON, A. W.; and PHILIPPI B., R. A. 'Las Aves de Chile, su conocimiento y sus costumbres. Tomo Primero.' 8vo, pp. 1–358 + 1, figs. 1–47 (col.), 1 map (col.), diagrams 1–3, 46 figs. (7 col), 1946. Platt Establecimientos Gráficos S. A., Buenos Aires. Price, $5.00 U. S. ($150.00 Chilean).

Nature on the Gulf Coast.[1]—This is a book of essays on nature in the Mississippi Delta region of Louisiana and Mississippi, with particular emphasis on bird life with which the author proves himself to be on familiar terms. It is in no sense a treatise on ornithology, but the pages are filled with observations that bespeak a keen perception and love of nature and an appreciation of her various moods and manifestations. It is a book to be read leisurely as much for the literary flavor as for the natural history lore, and in so doing the reader will absorb much ornithology with the outdoor atmosphere that pervades the pages. One might question the statement that the dorsal plumes of the Snowy Heron are "characteristic only of the female in the breeding season" but perhaps this is an unintentional slip.—JOHN T. ZIMMER.

Birds of eastern United States.[2]—Mr. Pough has presented a most useful guide to most of the land birds of eastern North America (the hawks, grouse, cranes, and pigeons are not included). The western limit is set along an irregular line at about the 100th meridian in the United States and near the eastern side of the Rocky Mountains in Canada. The area covered is thus more comprehensive than has usually been considered as "eastern" and the book treats of various birds which one has been accustomed to call "western" such as the Roadrunner, the becards, the Cañon Wren, and others, even though their ranges cross the arbitrarily set line at some points. No harm is done by this, however, and the work is thereby only the more comprehensive.

Each of the species has a page or so devoted to it, with a short description and an account of its habits, voice, nest, eggs, and range. These are concise and well-drawn and give much important information that an observer needs to help him identify an unknown bird.

In addition to the text, there are colored figures of every species, often in the various plumages. These figures, by Don Eckelberry, are mostly very good and show the birds to good advantage. Some of them are not so satisfactory as most, due in part to less accurate color reproduction. The Horned Lark's throat is distinctly green, for example, and the Prothonotary Warbler's head and breast are too brownish. Some of the eyes are shown rather too large, and the eye of the male Redstart is too low. These imperfections do not seriously impair the usefulness of the plates in identifying the species concerned, and the average is quite satisfactory.

Mr. Pough, restricting his nomenclature to species, has invented vernacular names for various species which have several subspecies, with the result that there are some quite unfamiliar names on his pages. In some cases the name of a particular subspecies has been adopted for the species as a whole. It must be admitted that until the A. O. U. Committee on Nomenclature completes its current work on a new edition of the 'Check-List' there is no "official" list of names for the various full species.

There is an informative introduction to the volume covering general ornithology and bird watching. In a section devoted to plumages, the reviewer would have liked to see the established term "juvenal" (now in Webster's Dictionary) instead of "juvenile" which is not certainly distinct from "immature"; neither term is definitive while juvenal is unequivocal. J. A. Allen long ago presented a nomenclature of plumages that has not yet been bettered although some additions may be necessary for plumages he did not discuss.

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[1] KOPMAN, HENRY HAZLITT. 'Wild Acres. A book of the Gulf Coast country.' 8vo, pp. 1–189, 1946. E. P. Dutton & Co., New York. Price $3.00.

[2] POUGH, RICHARD H. 'Audubon Bird Guide. Eastern Land Birds.' 8vo, pp. XXXVII + 2 + 312, pls. 1–48 (col.), 3 figs. map (end papers), 1946. Doubleday & Co., Inc., Garden City, New York Price, $3.00.

Regardless of these points, Mr. Pough's book is an excellent guide for the identification of birds in the field and with its unusual completeness of colored illustration should admirably serve the purpose for which it was designed. It should have a long and useful career.—JOHN T. ZIMMER.

Ducks in flight.[1]—Mr. Queeny has given us a superb volume for the naturalist, artist and sportsman. Devoted to ducks in the prairie lands of Arkansas, it contains as fine a collection of original photographs of these birds as the reviewer has had the good fortune to see. There are over two hundred of these, showing flocks and 'singles,' passing, coming in, settling, or leaving. Some of the most interesting ones were taken in sequence and illustrate successive phases of particular activities and the accompanying action of wings, tail, and legs—birds rising vertically from the water, flying momentarily upside down, dodging obstructions, making a "crash landing," changing direction, or performing almost any imaginable flight maneuver. It is clearly demonstrated, for example, that river ducks fly, not leap, out of the water, in a movement that takes place rather too rapidly for the unaided eye to perceive it. For about half of these critical pictures, Mr. Bishop has supplied a parallel drawing of the bird as photographed, showing the details that may be less clearly outlined in the photograph.

In addition to the illustrations, the author has supplied a correlative text discussing the mechanics of duck flight (with a supplementary comment by Glenn L. Martin), and a variety of observations on the birds' behavior under varying conditions. Other chapters describe the Arkansas region, some hunting experiences, a favorite dog, and practical suggestions for photographing flying ducks. There is thus presented a considerable amount of pertinent information that makes the work factually instructive as well as pictorially interesting.

Only a few minor errors have been noted: "uropygium" for "pygostyle," "Albert R. Rand" for "Brand," a transposition of "static" and "dynamic" in one of the captions, and a misidentification of the neossoptile tips of certain pictured feathers as "filoplumes." The greatest utility of the book will be found, of course, in the variety and excellence of the illustrations. The painter of ducks in motion should find here ample suggestion for attitudes, common or unusual, in which he can place his subjects. As the author quotes from Mr. Bishop, it is safer not to say, "Ducks never do that," but to say rather, "Ducks *seldom* do that"!

Mr. Queeny is to be complimented on his handsome and important addition to the ornithological bookshelf.—JOHN T. ZIMMER.

PERIODICAL LITERATURE

ADAMS, R. G. Actions of Long-tailed Duck under water. Brit. Birds, 39 (9): 283, Sept. 2, 1946.

ADAMS, R. G. Late Sedge-Warbler in Devon. Brit. Birds, 39 (9): 280, Sept. 2, 1946.

ADAMS, R. G. "Up-ending" by Redshank and Spotted Redshank. Brit. Birds, 39 (10): 319, Oct. 1, 1946.

ALCORN, GORDON D. Another record of the Skua from the state of Washington. Condor, 48 (5): 246–247, fig. 54, Sept. 30, 1946.

ALDRICH, JOHN W. Speciation in the white-cheeked geese. Wilson Bull., 58 (2): 94–103, June, 1946.—*Branta hutchinsii asiatica* (Bering Island, Siberia), *B. canadensis moffitti* (Blue Lake, near Coulee City, Washington), new subspecies.

[1] QUEENY, EDGAR M. 'Prairie Wings. Pen and Camera Flight Studies. Explanatory sketches by Richard E. Bishop.' 4to, pp. XIV + 256, frontisp. (col.), numerous photographs and drawings. Ducks Unlimited, Inc., New York, 1946. Price, $15.00 (De Luxe, $50.00).

ALEXANDER, W. B. The index of heron population, 1945. Brit. Birds, **39** (7): 201–206, July 1, 1946.

ALEXANDER, W. B. The Woodcock in the British Isles (cont.). Ibis, **88**: 159–179, May 14, 1946.

ALEXANDER, W. B. The Woodcock in the British Isles (cont.). Ibis, **88**: 271–286, July 19, 1946.

ALLRED, WARREN J. Wyoming Sage Grouse survey. Wyo. Wild Life, **10** (7): 28–31, July, 1946.

ALMOND, W. E. Notes on the song of the Black-headed Bunting. Brit. Birds, **39** (10): 315, Oct. 1, 1946.

ANDERSEN, TORBEN. Musvit (*Parus major*) plyndrer Rede af Landsvale (*Hirundo rustica*). Dansk Ornith. For. Tids., **40** (2): 151, June, 1946.

ANDERSON, ANDERS H. AND ANNE. Late nesting of the Pyrrhuloxia at Tucson, Arizona. Condor, **48** (5): 246, Sept. 30, 1946.

ANDERSON, ANDERS H. AND ANNE. Notes on the use of the creosote bush by birds. Condor, **48** (4): 179, July 31, 1946.

ANDERSON, ANDERS H. AND ANNE. The Painted Redstart near Tucson, Arizona. Condor, **48** (5): 248, Sept. 30, 1946.

ANDERSSON, TORE. Invandring av grönsångare, bastardnäktergal och rödvingetrast i trakten av Norrtälje. Vår Fågelv., **2** (2): 61–62, 1943.

ANDERSSON, TORE, AND BOLLVIK, RUNE. Nordliga iakttagelser av näktergal (*Luscinia luscinia* L.) 1944. Vår Fågelv., **4** (1): 33, 1945.

ANDERSSON, TORE, ET AL. Iakttagelser av rördrom (*Botaurus stellatus*) 1944. Vår Fågelv., **3** (4): 142, 1944.

ANONYMOUS. Bird life on the "Salisbury Plain" of Germany: Luneberg "close-ups." Illus. London News, **5598**: 136–137, 9 figs., Aug. 3, 1936.

ARNE, PAUL. Un nouveau lieu de ponte du Pétrel Tempête *Hydrobates pelagicus* (L.) 1758, sur les côtes de France. Alauda, **13**: 23–26, 1941–1945.

ASMUNDSON, V. S.; LORENZ, F. W.; AND MOSES, B. D. Influence of light intensity on ovulation in turkeys. Poultry Sci., **25** (4): 346–354, figs. 1–4, July, 1946.

AVELIN, HANS. Dvärgmås och svarttäna häcka i Mälaren nära Västerås. Vår Fågelv., **1** (2): 29, 1942.

BAGGALEY, WILLIAM. "Anting" by Starlings. Brit. Birds, **39** (7): 212, July 1, 1946.

BAILLIE, JAMES L., JR. The Redhead as a breeding bird of Michigan and Ontario. Wilson Bull., **58** (2): 111–112, 1 fig., June, 1946.

BAILLIE, R. H. Hazaribagh bird recordings. Jour. Bengal Nat. Hist. Soc., **20** (4): 111–127, Apr., 1946.

BARNES, J. A. G. Feeding habits of Redshank and Black-headed Gull. Brit. Birds, **39** (9): 285–286, Sept. 2, 1946.

BARNÉS, VENTURA, JR. Contribucion ornitologica. Rev. Fomento [Venezuela], **7–8** (61): 97–155, Oct.–Dec., 1945.

BARRAUD, E. M. Wing clapping of Turtle-Dove. Brit. Birds, **39** (9): 284, Sept. 2, 1946.

BARRETT, JOHN H. Ground display of Kentish Plover. Brit. Birds, **39** (9): 286–287, Sept. 2, 1946.

BARRETT, JOHN H., AND RUTTLEDGE, ROBERT F. Song-period of Goldcrest. Brit. Birds, **39** (10): 318, Oct. 1, 1946.

BEARDSLEE, C. S. The American Magpie at Niagara Falls. Prothonotary (mimeogr.), **12** (8): 45–46, Aug., 1946.

BEHLE, WILLIAM H. Notes on the synonymy and distribution of the Horned Larks of Utah. Proc. Utah Acad. Sci. Arts Letters, **19–20**: 153–156.

BEHLE, WILLIAM H. Water birds observed at Rock Island, Utah Lake, in 1932. Great Basin Nat., 6 (1–4): 127–128, Nov. 15, 1945.

BEHLE, WILLIAM H.: WOODBURY, A. M.; AND COTTAM, WALTER P. Further light on the 'fossil' bird nests of the Great Salt Lake Desert. Proc. Utah Acad. Sci., Arts and Letters, 21: 4, [?1945].

BELL, R. C. 'Birds of Vizagapatam District'—some notable omissions. Jour. Bombay Nat. Hist. Soc., 46 (1): 189–190, Apr., 1946.

BELSKY, N. V. Correlation of growth and differentiation during the postembryonic development of the pigeon. Comptes Rendus Acad. Sci. URSS, new series, 49 (9): 684–686, 1945.

BENSON, C. W. A collection from near Unangu, Portuguese East Africa. Ibis, 88: 240–241, May 14, 1946.

BENSON, C. W. A new Longtail from Southern Rhodesia. Bull. Brit. Orn. Club, 56 (465): 52–53, May 9, 1946.—*Prinia robertsi* (Vumba, near Umtali), new species.

BENSON, C. W. Crocodiles preying on Pelicans. Ibis, 88: 238–240, May 14, 1946.

BENSON, C. W. New name for *Cisticola lais nyikae* Benson. Bull. Brit. Orn. Club, 66 (459): 16, Nov. 6, 1945.—*C. l. mariae*, new name.

BENSON, C. W. Notes on the birds of southern Abyssinia (cont.). Ibis, 88: 180–205, May 14, 1946.

BENSON, C. W. Notes on the birds of southern Abyssinia (cont.). Ibis, 88: 287–306, July 19, 1946.

BENTHAM, HOWARD, "Injury-feigning" of Nuthatch. Brit. Birds, 39 (7): 214, July 1, 1946.

BERGSTRÖM, ULF. Ringduvor iakttagna under häckningstiden i Kvikkjokk. Vår Fågelv., 2 (1): 32, 1943.

BERLA, HERBERT FRANZONI. Alteração na pocição sistemática de *Pyrrhura pfrimeri* Miranda Ribeiro, 1920. Bol. Mus. Nac. [Rio de Janeiro] Zool., 64: 1–3, figs. 1–3, May 28, 1946.

BERLA, HERBERT F. Lista das aves colecionadas em Pernambuco, com descrição de uma subespécie n., de um alótipo ♀ e notas de campo. Bol. Mus. Nac. Rio de Janeiro, Zool., 65: 1–35, figs. 1–4, June 10, 1946.—*Tinamus solitarius pernambucensis* (Usina São José, Município de Igaraçu, Pernambuco), new subspecies.

BERLA, HERBERT F. Uma nova espécie do genero *Todirostrum* Lesson, 1831 (*Passeriformes Tyrannidae*). Summa Brasiliensis Biologiae, 1 (8): 125–127, 3 figs., June, 1946.—*Todirostrum tricolor* (Rio Jamarí, Mato Grosso, Brazil), new species.

BERLIOZ, J. Les psittacidés de la Nouvelle-Calédonie et des Établissements Français de l'Océanie. Oiseau, 15: 1–9, 1 pl. (col.), 1945.

BERLIOZ, J. Révision critique des Trochilidés du genre *Agyrtrina* Chubb. Oiseau, 15: 72–88, 1945.

BERTHET, GERARD. Notes et remarques sur l'avifaune française. Alauda, 13: 94–111, 1941–1945.

BERTHET, GERARD. Note sur la nidification de l'Aigrette Garzette *Egretta garzetta* (L.) en Dombes. Alauda, 13: 7–10, 1941–1945.

BERTHET, GERARD. Reprise d'un Étourneau bagué. Alauda, 13: 126, 1941–1945.

BEVEN, G. "Injury-feigning" of Blackbird. Brit. Birds, 39 (8): 248, Aug. 1, 1946.

BEVEN, G. Pre-coitional display of Chiffchaff. Brit. Birds, 39 (8): 246–247, Aug. 1, 1946.

BEVEN, G. Some notes and records of South African birds. Ostrich, 17 (2): 61–74, figs. 1–4, June, 1946.

BEVEN, G. Some notes on song. Ostrich, 17 (2): 51–60, June, 1946.

BEVEN, G., AND THOMPSON, A. J. B. Food-washing of Whimbrel and Dunlin. Brit. Birds, **39** (8): 249–250, Aug. 1, 1946.

BEVEN, G., AND THOMSON, W. W. Courtship feeding of Willow-Tit. Brit. Birds, **39** (8): 245, Aug. 1, 1946.

BIKANER, MAHARAJA OF. Occurrence of the Pink-footed Goose (*Anser fabalis brachyrhynchus* Baillon) in India: an authentic record. Jour. Bombay Nat. Hist. Soc., **46** (1): 185–187, Apr., 1946.

BISPHAM, T. Status of the Corn-Bunting in Essex. Brit. Birds, **39** (9): 277, Sept. 2, 1946.

BLAKE, CHARLES H. A query on migration. Emu, **46** (1): 74–75, July 29, 1946.

BLATHWAYT, F. L. Report on Dorset birds, 1944. Proc. Dorset Nat. Hist. & Archaeol. Soc., **66**: 130–135, 1945.

BLOM-BJORNER, J. Breeding season of *Sagittarius serpentarius*. Jour. E. Africa Nat. Hist. Soc., **83–84** (3–4): 158, Jan., 1946.

BLOM-BJORNER, J. Harrier-Eagle eating a toad. Jour. E. Africa Nat. Hist. Soc., **83–84** (3–4): 158–159, Jan., 1946.

BLOM-BJORNER, SIDNEY. *Circaetus cinerascens*. Jour. E. Africa Nat. Hist. Soc., **83–84** (3–4): 159, Jan., 1946.

BLOM-BJORNER, SIDNEY. *Pernis apivorus apivorus*. Jour. E. Africa Nat. Hist. Soc., **83–84** (3–4): 159, Jan., 1946.

BLOMGREN, ARNE. Iakttagelser över fågelflyttningen i Lule älvdal. Vår Fågelv., **2** (3): 89–93, 1943.

BLUME, C. A. Pomeransfugle (*Charadrius morinellus*) i Flok paa Efteraarstraek. Dansk Ornith. For. Tids., **40** (2): 153, June, 1946.

BLUME, C. A. Sortegraa Ryle (*Calidris maritima*) i Kalveboderne. Dansk Ornith. For. Tids., **40** (2): 153, June, 1946.

BOEHM, E. F. Distraction display by breeding birds in south Australia. So. Austral. Ornith., **18** (1): 2–4, Mar., 1946.

BOEHM, E. F. Fuscous Honeyeater in south Australia. Emu, **46** (1): 77, July 29, 1946.

BOEHM, ERHARD F. Little Crow in the Northern Territory. Emu, **46** (1): 67, July 29, 1946.

BOER, F. G. J., AND TEKKE, M. J. Wederom een broedgeval van de hop (*Upupa e. epops*) L. in Westelijk Nederland. Limosa, **17** (2–3): 88–89, Sept., 1944.

BOLLVIK, RUNE. Fågelnotiser från Lule lappmark. Vår Fågelv., **2** (4): 108–113, 1943.

BOLLVIK, RUNE. Svenska fynd av brun glada (*Milvus migrans* Bodd.). Vår Fågelv., **3** (3): 103–105, 1944.—Summary in German.

BOLLVIK, R.; MALMSTRÖM, A.; AND SVÄRDSON, G. Ökenlöparen (*Cursorius cursor* Lath.) iakttagen vid Ölands sodra udde. Vår Fågelv., **1** (3): 44–46, 1942.—Summary in German.

BOND, W. R. G. The common or garden bird; its reaction to human habitations. Proc. Dorset Nat. Hist. & Archaeol. Soc., **66**: 136–143, 1945.

BORDEN, R. W. Man-o-war bird at Morehead City, N. C. Chat, **10** (4): 71, 1 fig., Sept., 1946.

BORG, ÄKE. Blåkråka (*Coracias garrulus* L.) sedd under häckningstiden i Stockholms skärgård. Vår Fågelv., **4** (2): 88, 1945.

BORRERO, JOSÉ IGNACIO. Aves migratorias en la Sabana de Bogotá. Caldasia, **3** (14): 407–414, Sept. 20, 1945.

BORRERO, JOSÉ IGNACIO. Aves migratorias en los parques y jardines de Bogotá. Caldasia, **3** (14): 415–418, Sept. 20, 1945.

BORRERO, JOSÉ IGNACIO. Aves ocasionales en la Sabana de Bogotá. Caldasia, 4 (17): 169–173, Aug. 15, 1946.

BORRERO, JOSÉ IGNACIO. Tres patos ocasionales en la Sabana de Bogotá y la Laguna de Fúquene. Caldasia, 3 (12): 227–231, Oct. 20, 1944.

BOS, G.; SLIJPER, H. J.; AND TAAPKEN, J. De invasie van de kruisbek (*Loxia curvirostra*) in Nederland in 1942–43. Limosa, 16 (3): 81–100, figs. 1–3, Sept., 1943.—Summary in German.

BOSAEUS, INGMAR. Tidig tofsvipa i Norrbotten. Vår Fågelv., 4 (1): 33, 1945.

BOURDELLE, M. E., AND GIBAN, M. J. Bulletin des Stations Françaises de Baguage, No. 3 (1939–1942) *in* Oiseau, 15: 1–47 (separate pagination), 1945.

BOURKE, P. A. Hovering by Cuckoo-shrike. Emu, 46 (1): 77, July 29, 1946.

BRAUN, L. V. Sannolik häckning av Kungsfiskare i Getinge, Halland. Vår Fågelv., 1 (3): 48, 1942.

BRECKENRIDGE, W. J. A Rose-breasted Grosbeak-Cowbird puzzle. Flicker, 18 (3): 62, Sept., 1946.

BRIGHTWELL, L. R. In praise of penguins. Field, 188 (4893): 378–379, 10 figs., Oct. 5, 1946.

BROBERG, LARS, ET AL. Iakttagelser av rördrom (*Botaurus stellaris* L.). Vår Fågelv., 4 (4): 190–191, 1945.

BRONZONI, ERMANNO. Descrizione di un ibrido *Crax fasciolata* × *C. alberti*. Riv. Ital. Orn., 10 (1): 11–21, pls. 2–7 (2, 3 col.), Jan., 1940.

BROWN, PHILIP E. Preliminary observations on a colony of Reed-Warblers. Brit. Birds, 39 (10): 290–308, pls. 37–38, Oct. 1, 1946

BROWN, R. H. Note of Willow-Warbler. Brit. Birds, 39 (9): 279–280, Sept. 2, 1946.

BRUCE, A. C. Arctic Skua in Hertfordshire. Brit. Birds, 39 (9): 287, Sept. 2, 1946.

BULL, JOHN L., JR. The ornithological year 1944 in the New York City region. Proc. Linn. Soc. N. Y., 54–57: 28–35, Sept. 16, 1946.

BURLEIGH, THOMAS D., AND LOWERY, GEORGE H., JR. Races of *Vireo griseus* in eastern United States. Amer. Midl. Nat., 34 (2): 526–530, Sept., 1945.

BURTON, R. E., AND FERGUSON LEES, I. J. Temminck's Stint in Northamptonshire. Brit. Birds, 39 (8): 250–251, Aug. 1, 1946.

BUTLIN, SYBIL M. Note of Willow-Warbler. Brit. Birds, 39 (7): 215, July 1, 1946.

BUTTERS, F. C. Turtle-Dove wintering in Devonshire. Brit. Birds, 39 (8): 249, Aug. 1, 1946.

BUXTON, E. J. M. Nesting of Curlew in Buckinghamshire. Brit. Birds, 39 (8): 249, Aug. 1, 1946.

C., H. African Harrier-Hawks hunting weaver fledglings. Jour. E. Africa Nat. Hist. Soc., 83–84 (3–4): 161, Jan., 1946.

CALDWELL, JANETTE. Display of Nuthatch in winter. Brit. Birds, 39 (7): 213, July 1, 1946.

CAMPBELL, JAMES W. The food of the Wigeon and Brent Goose (cont.). Brit. Birds, 39 (7): 194–200, July 1, 1946.

CAMPBELL, JAMES W. The food of the Wigeon and Brent Goose (concl.). Brit. Birds, 39 (8): 226-232, Aug. 1, 1946.

CARLSON, TORSTEN. Bofynd av lavskrika (*Cractes infaustus* L.) med tre matande fåglar. Vår Fågelv., 5 (1): 37–38, 1946.

CARMICHAEL LOW, G. Bewick's Swans in London. Brit. Birds, 39 (7): 219, July 1, 1946.

CARPENTIER, C. J. Un Tichodrome en Bretagne. Oiseau, 15: 166–167, 1945.

CARTER, G. S. Mimicry, protective resemblance and animal behaviour. Sci. Progress, 34 (135): 547–551, July, 1946.

CAVE, F. O. Some further notes on *Merops-Ardeotis* perching associations. Ibis, **88**: 236–238, May 14, 1946.

CEDELL, H. Rosenfink har iakttagits vid Ronneby. Vår Fågelv., **1** (3): 47, 1942.

CHAPIN, JAMES P. Wideawake Fair invaded. Nat. Hist., **55** (7): 313–319, 16 figs., Sept., 1946.

CHAPPELL, BERTRAM M. A. Courtship feeding of Blackbird. Brit. Birds, **39** (7): 215–216, July 1, 1946.

CHAPPELL, BERTRAM M. A. Siting of Crested Lark's nest. Brit. Birds, **39** (9): 278, Sept. 2, 1946.

CHAPPELL, BERTRAM M. A. Sky-Larks nesting in artificial depressions. Brit. Birds, **39** (9): 278–279, Sept. 2, 1946.

CHISHOLM, A. H. The riddle of the mocking-birds (cont.). Victor. Nat., **63** (2): 31–39, pl. 6, June, 1946.

CHRISTISON, PHILIP, ET AL. Field notes on the birds of coastal Arakan and the foothills of the Yomas. Jour. Bombay Nat. Hist. Soc., **46** (1): 13–32, Apr., 1946.

CLANCEY, P. A. Coloration of soft parts of Crested Tits. Brit. Birds, **39** (7): 214–215, July 1, 1946.

CLANCEY, P. A. Golden Oriole in Lancashire in June. Brit. Birds, **39** (9): 276, Sept. 2, 1946.

CLANCEY, P. A. Party of Ospreys in Lanarkshire. Brit. Birds, **39** (7): 218, July 1, 1946.

CLANCEY, P. A. The status of the Red-breasted Flycatcher, *Siphia p. parva* Bech. in central Austria. Ibis, **88**: 399–400, July 19, 1946.

CLANCEY, P. A. Two new races of *Acanthis cannabina* (Linn.) from the western palaearctic region. Bull. Brit. Orn. Club, **56** (467): 83–85, Aug. 28, 1946.—*A. c. sejuncta* (Larkhill, near Amesbury, Wiltshire, England), *A. c. autochthona* (Carmunnock, N. W. Lanarkshire, S. W. Scotland), new subspecies.

CLANCEY, P. A. Varieties of the British Robin. Brit. Birds, **39** (9): 281–282, pl. 36, Sept. 2, 1946.

CLANCEY, P. A.; SOUTHERN, H. N.; AND TUCKER, B. W. A review of some recent researches, with remarks on the possible outcome of the present intensive racial survey of British birds. Bull. Brit. Orn. Club, **56** (467): 86–96, Aug. 28, 1946.

CLAY, THERESA. The Mallophagan parasites of the Passeriformes. Ibis, **88**: 403–405, July 19, 1946.

CLELAND, J. B. Birds noted between Finke railway station, Ernabella and the Everard Ranges. So. Austral, Ornith., **18** (1): 10, Mar., 1946.

COCKBURN, T. A. Some birds of the Gold Coast, with observations on their virus and parasitic infections. Ibis, **88**: 387–394, July 19, 1946.

COHEN, EDWIN. Unrecorded note of Green Woodpecker. Brit. Birds, **39** (8): 248, Aug. 1, 1946.

COHEN, EDWIN, AND GUNSTON, DAVID. Young birds returning to nest. Brit. Birds, **39** (8): 246, Aug. 1, 1946.

COLLING, A. W., AND BROWN, E. B. The breeding of Marsh and Montagu's Harriers in North Wales in 1945. Brit. Birds, **39** (8): 233–243, pls. 23–30, Aug. 1, 1946.

CONDON, H. T. Birds of south Australia. So. Austral. Ornith., **18** (2): 12–20, June, 1946.

CONDON, H. T. List of birds in south Australia. So. Austral. Ornith., **18** (1): 6–7, Mar., 1946.

CONDON, H. T. The Weebill in south Australia. So. Austral. Ornith., **18** (1): 5, Mar., 1946.

CONOVER, BOARDMAN. Notes on some neotropical hawks. **Fieldiana-Zool., 31 (5):** 39–45, Aug. 30, 1946.

COTT, HUGH B. The edibility of birds. Nature, **156 (3973): 736–737, Dec. 22,** 1945.—Relationship between edibility of the flesh and visibility of the plumage.

COTTEREAU, ELIE. Deux modes anormaux de nidification chez le Chardonneret *Carduelis carduelis* (L.). Alauda, **13:** 123–124, 1941–1945.

COURTENAY-LATIMER, M., AND GIBSON-HILL, C. A. A preliminary note on the Bird Island group in Algoa Bay. Ostrich, **17** (2): 75–86, 9 figs., 1 map, June, 1946.

COYLER, W. L., AND BEVEN, G. Sun-bathing of Long-tailed Tit and Hedge-Sparrow. Brit. Birds, **39** (8): 245–246, Aug. 1, 1946.

CULBERTSON, A. E. Occurrences of Poor-Wills in the Sierran foothills in winter. Condor, **48** (4): 158–159, July 31, 1946.

CUNNINGHAM, J. M. A new Red-billed Gull colony. New Zeal. Bird Notes, **2** (1): 12, July, 1946.

DAHLBECK, NILS. Havsörn (*Haliaetus albicilla* L.) och Kungsörn (*Aquila chrysaetos* L.) som häckfåglar i Sverige (1940–41). Vår Fågelv., **1** (1): 1–6, 1 map, 1942.—Summary in German.

DAVIS, D. Occurrence of the White-bellied or Snow Pigeon (*Columba leuconota leuconota*) at a low level in the Kumaon Himalaya. Jour. Bombay Nat. Hist. Soc., **46** (1): 184–185, Apr., 1946.

DAVIS, H. H., AND THOMPSON, A. J. B. American Wigeon in Somerset and Gloucestershire. Brit. Birds, **39** (7): 219–220, July 1, 1946.

DE GREEF, G. J. M. Dicht bij elkaar nestelen van putter (*Carduelis carduelis*) en groenling (*Chloris chloris*). Limosa, **17** (2–3): 101, Sept., 1944.

DEIGNAN, H. G. Descriptions of two new Leafbirds from Siam. Smiths. Misc. Collect., **106** (12): 1–3, June 24, 1946.—*Chloropsis cochin-chinensis seri-thai* (Ban Tha Lo, southwest of Surat Thani or Ban Don, Peninsular Siam), *C. aurifrons pridii* (Doi Ang Ka or Doi Inthanon, northwestern Siam), new subspecies.

DEIGNAN, H. G. The correct names of three Asiatic birds. Ibis, **88:** 402–403, July 19, 1946.

DE KIRILINE, LOUISE. A bird in the hand. Aud. Mag., **48** (5): sect. 1: 284–293, 15 figs., Sept.–Oct., 1946.—Banding station, Pimisi Bay, northern Ontario.

DELACOUR, JEAN. Le sauvetage du Cygne Trompette (*Cygnus c. buccinator*). Oiseau, **15:** 40–48, 1945.

DELACOUR, JEAN. L'Oiseau-Parasol (*Cephalopterus ornatus*). Oiseau, **15:** 130–140, 4 pls., 1945.

DELACOUR, JEAN, AND MAYR, ERNST. Supplementary notes on the family *Anatidae*. Wilson Bull., **58** (2): 104–110, fig. 1, June, 1946.

DELJE, GUSTAF, AND LUNDIN, HARRY. Några anteckningar om fågelfaunan i sodrä Tornedalen. Vår Fågelv., **2** (2): 58–61, 1943.

DEMENTIEFF, GEORGES. La fauconnerie en Russie—esquisse historique. Oiseau, **15:** 10–39, 3 pls., 3 figs., 1945.

DENTON, J. FRED. Winter roosting site of Phoebe. Oriole, **11** (3): 53–54, July, 1946.

DERY, D. A. Preliminary report on the winter diet of the Willow Ptarmigan in northern Quebec. Provancher Soc. Annual Report: 77–81, 1 fig., 1945.

DE SCHAUENSEE, RODOLPHE MEYER. On two collections of birds from the Southern Shan States, Burma. Proc. Acad. Nat. Sci. Phila., **98:** 99–122, July 10, 1946.—*Garrulax erythrocephalus shanus* (Kyu Loi, Keng Tung, Southern Shan States), *Abroscopus superciliaris contii* (Mong Lin, Southern Shan States), new subspecies, *Garrulax leucolophus peninsularis*, new name for *G. l. peninsulae*.

DE VRIES, T. G. Een bijdrage tot de kennis van de broedbiologie van den grauwen vliegenvanger, *Muscicapa s. striata* (Pall.). Limosa, **17** (2–3): 98–99, Sept., 1944.

DE VRIES, T. G. Een broedgeval van de kolgans, *Anser a. albifrons* (Scop.) in Nederland. Limosa, **17** (2–3): 82–84, Sept., 1944.

DE VRIES, T. G. Oölogische en nidologische mededeelingen, 1943. Limosa, **16** (3): 114–116, Sept., 1943.

DE VRIES, T. G. Oölogische en nidologische mededeelingen, 1944. Limosa, **17** (2–3): 89–94, Sept., 1944.

DINI, GUIDO. Cattura di uno Stercorario mezzano (*Stercorarius pomatorhinus*) e di una Strolaga mezzana (*Colymbus arcticus*) di dimensioni non comuni. Riv. Ital. Orn., **10** (2): 135–137, figs. 1–2, Apr., 1940.

DOBSON, RODERICK, AND LOCKLEY, R. M. Gannets breeding in the Channel Islands: two new colonies. Brit. Birds, **39** (10): 309–312, pls. 40–42, 2 maps, Oct. 1, 1946.

DOMM, L. V., AND TABER, ELSIE. Endocrine factors controlling erythrocyte concentration in the blood of the domestic fowl. Physiol. Zool., **19** (3): 258–281, figs. 1–10, July, 1946.

DOUAUD, J. La Bouscarle *Cettia cetti* dans l'estuaire de la Loire. Alauda, **13**: 90–93, 1941–1945.

DOUGLAS, GORDON. Lapwing's nest with six eggs. Brit. Birds, **39** (10): 320, Oct. 1, 1946.

DOUGLAS-HOME, H. Turtle-Dove nesting in Scotland. Brit .Birds, **39** (9): 283–284, Sept. 2, 1946.

DUGAND, ARMANDO. Notas ornitologicas colombianas II. Caldasia, **3** (14): 397–405, Sept. 20, 1945.

DUGAND, ARMANDO, AND BORRERO, JOSE IGNACIO. Aves de las ribera colombiana del Amazonas. Caldasia, **4** (17): 131–167, 2 figs., 1 map, Aug. 15, 1946.—Summary in English.

DURANGO, ANN-MARI AND S. Om nötväckans (*Sitta e. europea* L.) fortplantningsbiologi. Vår Fågelv., **1** (3): 33–44, 1942.—Summary in English.

DURANGO, S. Om större hackspettens, *Dryobates m. major* (L.) häckningsbiologi. Vår Fågelv., **4** (1): 4–18, 1945.—Summary in English.

DURANGO, S. Om svartmesens (*Parus ater ater* L.) biotop = och boplatsval. Vår Fågelv., **5** (1): 1–8, figs. 1–3, 1946.—Summary in English.

EIFRIG, C. W. G. More western birds seen in Florida. Florida Nat., **19** (4): 63, July, 1946.

EISENMANN, EUGENE. Home-staking with a song. Aud. Mag., **48** (5): sect. 1: 266–270, 7 figs., Sept.–Oct., 1946.

EISENMANN, EUGENE. Interchange of song between Blue-winged and Golden-winged Warblers. Proc. Linn. Soc. N. Y., **54–57**: 53–54, Sept. 16, 1946.

ELLIOTT, JOHN J. A feeding incident of the Black-billed Cuckoo. Proc. Linn. Soc. N. Y., **54–57**: 49–50, Sept. 16, 1946.

ELLIOTT, JOHN J. Observations on birds relative to the predatory New York weasel. Proc. Linn. Soc. N. Y., **54–57**: 56–57, Sept. 16, 1946.

ELLIS, JOHN C. S. Little Owl's method of taking pheasant chick by daylight. Brit. Birds, **39** (7): 217, July 1, 1946.

ERMANNO, BRONZINI. Dieci anni di attività avicola del Giardino Zoologico di Roma. Riv. Ital. Orn., **16** (3): 93–114, July, 1946.

FAVALORO, NORMAN. Eggs of the Powerful Owl. Emu, **46** (1): 44–48, 1 fig., July 29, 1946.

FAVERO, LEANDRO. Osservazioni ornitologiche in Provincia di Venezia. Riv. Ital. Orn., **10** (1): 59–62, Jan., 1940.

FAXÉN, Lars. Invasionen av tallbit (*Pinicola enucleator* L.) vintern 1942–43. Vår Fågelv., **4** (1): 18–26, 1 map, 1945.—Summary in German.

FERGUSON LEES, I. J. Greenfinch adapting Chaffinch's nest. Brit. Birds, **39** (9): 276, Sept. 2, 1946.

FERGUSON LEES, I. J. Half-roof on nest of Chaffinch. Brit. Birds, **39** (7): 213, July 1, 1946.

FERGUSON LEES, I. J. Irregular laying of Spotted Flycatcher. Brit. Birds, **39** (9): 279, Sept. 2, 1946.

FERGUSON LEES, I. J. Song of female Greenfinch. Brit. Birds, **39** (8): 244, Aug. 1, 1946.

FERGUSON LEES, I. J. Sparrow-Hawk in Outer Hebrides. Brit. Birds, **39** (9): 282, Sept. 2, 1946.

FERNANDEZ YEPEZ, ALBERTO. Avifauna Venezolana, II, Orden Colymbiformes. Mem. Soc. Ciencias Nat. La Salle, **5** (14): 17–18, Sept.–Dec., 1945.

FERNANDEZ YEPEZ, ALBERTO. La avifauna venezolana y su distribución en zonas altitudinales. Acta Venez., **1** (3): 346–353, 1 map, Jan.–Mar., 1946.

FILMER, I. G. The birds of Victoria Park, Brisbane. Queensland Nat., **13** (2): 34–39, Aug., 1946.

FISCHER, RICHARD B. Royal Terns on Long Island. Proc. Linn. Soc. N. Y., **54–57**: 47–48, Sept. 16, 1946.

FISCHER, WILHELM. Rosenfinksfynd i Umeå. Vår Fågelv., **3** (2): 74–77, 1944.

FISHER, HARVEY IRVIN. Adaptations and comparative anatomy of the locomotor apparatus of new world vultures. Amer. Midl. Nat., **35** (3): 545–727, pls. 1–13, figs. 1–28, May, 1946.

FITCH, HENRY S.; SWENSON, FREEMAN; AND TILLOTSON, DANIEL F. Behavior and food habits of the Red-tailed Hawk. Condor, **48** (5): 205–237, figs. 43–50, Sept. 30, 1946.

FITTER, R. S. R. Black Redstarts in the London area in the summer of 1945. London Nat., Suppl. **10**: 25–26, pls. 2–3, July, 1946.

FITTER, R. S. R. Report of the Black Redstart inquiry for 1945. Brit. Birds, **39** (7): 207–211, July 1, 1946.

FLAIG, ELEANORE. These birds are dancers. Travel, **87** (4): 10–13, 31, 10 figs., Aug., 1946.

FOOGDE, HUGO. Svarttärnan (*Chlidonias nigra* L.) häckande i Vänern. Vår Fågelv., **3** (1): 39, 1944.

FORSELIUS, STEN-ERIK. Gräshoppsångare i Uppland. Vår Fågelv., **4** (4): 190, 1945.

FRANCIS, L. S. Birds seen along the River Murray between Blanchetown and Renmark. So. Austral. Ornith., **18** (1): 8, Mar., 1946.

FREDRIKSSON, SVEN. Nytt fynd av häckande havsörn (*Haliaetus albicilla*) i Lule lappmark. Vår Fågelv., **3** (2): 79, 1944.

FRUGIS, SERGIO. Su di una rondine comune (*Hirundo rustica*) con le timoniere esterne straordinariamente allungate. Riv. Ital. Orn., **16** (3): 129, July, 1946.

FUGGLES-COUCHMAN, N. R., AND ELLIOTT, H. F. I. Some records and field-notes from north-eastern Tanganyika Territory. Ibis, **88**: 327–347, fig. 17, July 19, 1946.

GANIER, ALBERT F. Crested Flycatcher destroys caterpillars. Migrant, **17** (2): 30, June, 1946.

GARRETT, V. R., AND GODDARD, F. J. Snowy Owls in Cornwall and Hampshire. Brit. Birds, **39** (7): 216, July 1, 1946.

GARRISON, DAVID L. Spring in Lorraine. Bull. Mass. Aud. Soc., **30** (6–7): 199–208, 1 map, Aug.–Oct., 1946.

GASHWILER, JAY S. Observation of the feeding habits of the Pine Grosbeak (*Pinicola enucleator*). Bull. Maine Aud. Soc. (mimeogr.), **2** (3): 75–76, July, 1946.

GIBB, J. A. Egg-laying intervals of Shag. Brit. Birds, **39** (7): 220–221, July 1, 1946.

GILLHAM, ERIC. Woodchat Shrike in Kent. Brit. Birds, **39** (9): 279, Sept. 2, 1946.

GIRELL, BENGT H. Asköviken—en fågelnik mälarvik. Vår Fågelv., **1** (4): 59–62, 1942.

GLADSTONE, HUGH. British birds named after persons. Trans. Dumfriesshire and Galloway Nat. Hist. & Antiq. Soc., (3) **23**: 175–189, 3 pls., 1946.

GLADSTONE, HUGH. The meaning of the names of some British birds and their first use in British ornithology. Trans. Dumfriesshire and Galloway Nat. Hist. & Antiq. Soc., (3) **23**: 84–115, 1946.

GLAUERT, L. Black Falcon in western Australia. Emu, **46** (1): 75, July 29, 1946.

GLEGG, WILLIAM E. Animate perching associations. Ibis, **88**: 399, July 19, 1946.

GLEGG, WILLIAM E. Overlooked record of Kentish Plover in Middlesex. Brit. Birds, **39** (10): 319–320, Oct. 1, 1946.

GLENNY, FRED H. A systematic study of the main arteries in the region of the heart—Aves XI. Tinamiformes—with some notes on their apparent relationship with the Galliformes. Cand. Jour. Research, **24** (3)-sect. D: 31–38, figs. 1–3, June, 1946.

GOODBODY, JOHN AND IVAN; AND BARLEE, J. Notes from the Great Saltee Island, Co. Wexford. Irish Nat. Jour., **8** (11): 396, July, 1946.

GRANT, C. H. B., AND MACKWORTH-PRAED, C. W. Notes on eastern African birds. Bull. Brit. Orn. Club, **66** (459): 7–9, Nov. 6, 1945.

GREAVES, R. H. Notes on the Nile Valley Sunbird, *Hedydipna metallica* (Lichten.). Ibis, **88**: 235–236, May 14, 1946.

GREGORY, WILLIAM K. Some critical phylogenetic stages leading to the flight of birds. Proc. Linn. Soc. N. Y., **54–57**: 1–15, figs. 1–7, Sept. 16, 1946.

GREIDANUS, H. T. VAN W. The sparking-over movements in animals and man. Jour. Compar. Psychol., **39** (3): 177–184, June, 1946.

GRISCOM, LUDLOW. The changing seasons. Aud. Mag., **48** (3) sect. 1: 250–251, July–Aug., 1946.

GRISCOM, LUDLOW. The changing seasons. Aud. Mag., **48** (5) sect. 1: 314, Sept.–Oct., 1946.

GUICHARD, GEORGES. Note sur la répartition géographique en France de *Locustella luscinioides luscinioides* (Savi). Alauda, 13: 121–122, 1941–1945.

GULLIKSSON, GULLIK. Tidig häckning av morkulla i mellersta Norrland. Vår Fågelv., **4** (1): 34, 1945.

GUNTHER, LLOYD F. Copulation performed by Killdeer during incubation period. Condor, **48** (4): 180, July 31, 1946.

GUSTAFSSON, KARL-JAKOB. Bofynd av rödvingetrast (*Turdus iliacus* L.) i Småland. Vår Fågelv., **5** (1): 38, 1946.

GUSTAFSON, KARL-JAKOB. Häckningsfynd av lilla flugsnapparen (*Muscicapa p. parva* Bechst.) i Småland. Vår Fågelv., **3** (3): 100–102, 1944.

HAARTMAN, LARS. Några fall av polygami hos avart och vita flugsnapparen (*Muscicapa h. hypoleuca* Pall.). Vår Fågelv., **4** (1): 27–32, 1 map, 1945.—Summary in English.

HAECKER, F. W. Alfred M. Brooking. Nebr. Bird Rev., **14** (1): 27–28, Jan.–June, 1946.—An obituary.

HAINES, LAWRENCE C. Lorikeets prefer different diets. Emu, **46** (1): 76, July 29, 1946.

HAINES, R. L. Night life in a marsh. Cassinia, **25**: 35–36, June, 1946.

HALL, A. H. Song-period of Goldcrest. Brit. Birds, **39** (7): 215, July 1, 1946.

HANNERZ, DAG. Vaktel (*Coturnix coturnix* L.) hörd i Värmland i juni 1943. Vår Fågelv., **2** (3): 95, 1943.

HARDY, ERIC. Probable nesting of the Rose-coloured Pastor in Lebanon in 1945. Ibis, **88**: 398, July 19, 1946.

HARE, LEIGHTON H. The Larger Striped Swallow in East Africa. Ostrich, **17** (2): 127–128, June, 1946.

HARRIS, HARRY. An appreciation of Allan Brooks, zoological artist: 1869–1946. Condor, **48** (4): 145–153, figs. 28–36, July 31, 1946.

HARRISON, JAMES M. Goldeneye-Smew hybrid. Bull. Brit. Orn. Club, **56** (465): 54, May 9, 1946.

HARRISON, JAMES M. Little Ringed Plover in Kent. Brit. Birds, **39** (8): 251–252, Aug. 1, 1946.

HARRISON, JAMES M. Sun-bathing by birds. Brit. Birds, **39** (9): 276, Sept. 2, 1946.

HARRISON, J. M. Three new races of *Fringilla coelebs* L. from the Mediterranean region. Bull. Brit. Orn. Club, **66** (459): 4–7, Nov. 6, 1945.—*Fringilla coelebs iberiae* (Cizimbra, south Portugal), *F. c. syriaca* (Becharres, Lebanon), *F. c. cypriotis* (Platres, Cyprus), new subspecies.

HARTHAN, A. J. Quail calling in flight. Brit. Birds, **39** (9): 288, Sept. 2, 1946.

HARTLEY, P. H. T. The food of the Kestrel in Palestine. Ibis, **88**: 241–242, May 14, 1946.

HARVEY, BERNARD F. Display of Song-Thrush. Brit. Birds, **39** (8): 247–248, Aug. 1, 1946.

HAUGAN, AXEL. Gulnäbbad hämpling har häckat i Tärna i Lappland. Vår Fågelv., **2** (1): 31, 1943.

HAVERSCHMIDT, FR. Capture of adult ground-nesting birds on nest for ringing purposes. Dansk Ornith. For. Tids., **40** (2): 97–107, figs. 1–4, June, 1946.—Summary in Danish.

HEBARD, FREDERICK V. Red-bellied Woodpecker and Red-tailed Hawk nesting in same tree. Oriole, **11** (3): 53, July, 1946.

HELLEBREKERS, W. PH. J. Het vraagstuk van het erythrisme. Limosa, **17** (2–3): 84–88, Sept., 1944.

HELLEBREKERS, W. PH. J. Vermeldenswaardige legsels in het Rijksmuseum van Natuurlijke Historie to Leiden. Limosa, **16** (3): 101–112, Sept., 1943.

HENDERSHOT, W. B. Our pheasants went to war, too! Ohio Conserv. Bull., **10** (9): 4–5, 2 figs., 1 map, Sept., 1946.

HENDERSON, MARY. Gannets at some distance from the sea. Brit. Birds, **39** (7): 221, July 1, 1946.

HENS, P. Een brutale sperwer (*Accipiter nisus*). Limosa, **17** (2–3): 100–101, Sept., 1944.

HENS, P. Een late coievaar (*Ciconia ciconia*) te Delft in 1575. Limosa, **17** (2–3): 100, Sept., 1944.

HERMANSON, WALTER. Tidig häckning av gråärla. Vår Fågelv., **2** (1): 31, 1943.

HILL, RAYMOND W. Bronzed Grackle "anting" with mothballs. Wils. Bull., **58** (2): 112, June, 1946.

HINDWOOD, K. A. A list of the types and paratypes of birds from Australian localities in the Australian Museum, Sydney, New South Wales. Rec. Austral. Mus., **21** (7): 386–393, June 24, 1946.

HINDWOOD, K. A. The stomach contents of young Mutton-birds. Emu, **46** (1): 71–73, July 29, 1946.

HINDWOOD, K. A., AND MAYR, ERNST. A revision of the Striped-crowned Pardalotes. Emu, **46** (1): 49–67, pl. 5, 1 map, July 29, 1946.

HOBBY, B. M. A further instance of "anting" by a Starling. Proc. Royal Entomol. Soc. London, **21** (1–3): 2, Mar. 15, 1946.

HOFFMAN, H. J. Evidence of part played by male Red-backed Shrike in site-selection. Brit. Birds, **39** (10): 317, Oct. 1, 1946.

HÖGFELDT, P. J. En flock biätare (*Merops apiaster* L.) i Uppland. Vår Fågelv. **3** (3): 110, 1944.

HOHN, E. O. Some recent observations on Starling roosts in the London area. London Nat., Suppl. **10**: 26–28, July, 1946.

HOLGERSEN, HOLGER. Antarctic and sub-antarctic birds. Det Norske Vidensk.-Akad. Oslo, **23**: 3–100, figs. 1–23, May 18, 1945.—Scientific results of Norwegian Antarctic Expeditions 1927–1928.

HOLLOM, P. A. D. Rustic Bunting on Fair Isle. Brit. Birds, **39** (9): 278, Sept. 2, 1946.

HOLMAN, F. C. Does the Buff-backed Heron really remove ticks from the bodies of animals? Ibis, **88**: 232–233, May 14, 1946.

HOLMES, P. F. White Wagtail roost. Brit. Birds, **39** (8): 245, Aug. 1, 1946.

HOLROYDE, F. J. Kestrel taking Redwing. Brit. Birds, **39** (9): 282, Sept. 2, 1946.

HØRRING, R. Fortsatte resultater af Ringmaerkningerne i 1931–42. Vidensk. Meddel. (Copenhagen), **106**: 415–426, 1942–43.

HORTLING, IVAR. Finlands örnar. Vår Fågelv., **3** (1): 33–38, 1944.—Summary in German.

HUDSON, J. RICHARD. Pale specimen of Yellow-vented Bulbul (*Pycnonotus tricolor* Fayi). Jour. E. Africa Nat. Hist. Soc., **83–84** (3–4): 161–162, Jan., 1946.

HUE, FR. Nouveaux cas de nidification du Coucou-Geai *Clamator glandarius* (L.), en France. Oiseau, **15**: 89–93, 1945.

INGLIS, C. M. The Minivets and Cuckoo-Shrikes of Bengal (cont.). Jour. Bengal Nat. Hist. Soc., **20** (4): 109–111, 1 pl. (col.), Apr., 1946.

IREDALE, TOM. A new Australian parrot. Emu, **46** (1): 1–2, pl. 1 (col.), July 29, 1946.—*Opopsitta marshalli* (Great Divide Range behind Lockhart River, Cape York, Queensland), new species.

JACOBS, DON. First Minnesota nesting of the Philadelphia Vireo. Flicker, **18** (3): 57, Sept., 1946.

JAKOBSON, NISSE. Fåglar i Nydala socken, Småland. Vår Fågelv., **4** (4): 178–189, 1945.—Summary in German.

JANSSON, KARIN, ET AL. Mindre sangsvan (*Cygnus bewickii* Yarrell) i Flackebo i Vastmanland. Vår Fågelv., **4** (2): 87–88, 1945.

JAQUES, FLORENCE PAGE. Thomas Sadler Roberts. Aud. Mag., **48** (5) sect. 1: 301–303, 2 figs., Sept.–Oct., 1946.—Biographical sketch.

JENSEN, P. VALENTIN. Nogle Iagttagelser over Sandternens (*Gelochelidon nilotica* (Gm.)) Biologi. Dansk Ornith. For. Tids., **40** (2): 80–96, figs. 1–8, June, 1946.—Summary in English.

JERN, TOR. Häckning av trastsångare (*Acrocephalus arundinaceus* L.) i Hornborgasjön. Vår Fågelv., **5** (1): 35–36, 1 fig., 1946.

JEWETT, STANLEY G. A Ross Goose taken in Wallowa County, Oregon. Condor, **48** (4): 181, July 31, 1946.

JEWETT, STANLEY G. The Starling in Oregon. Condor, **48** (5): 245, Sept. 30, 1946.

JOHANSEN, HANS. De Gule Vipstjerters (*Motacilla flava* L.) systematik og udbredelse. Dansk Ornith. For. Tids., **40** (2): 121–142, 1 map, June, 1946.—Summary in English.

JOHANSSON, OTTO. Havsörnspar häckar i Misterhults skärgård, Kalmar län. **Vår Fågelv., 3** (2): 79, 1944.

JOHNSON, MAGNUS. Bird life in Kaimanawa Ranges. **N. Z. Bird Notes, 2** (1): 16, July 1, 1946.

JONES, R. BARK. An account of a visit to the Brothers (Jebel Teir) Islands in the Gulf of Aden. **Ibis, 88**: 228–232, fig. 16, May 14, 1946.

JULL, MORLEY A., AND PHILLIPS, ROBERT E. Hatchability in relation to consanguinity of breeding stock in turkeys. **Poultry Sci., 25** (4): 312–319, July, 1946.

KARVIK, NILS-GERHARD. Knölsvan häckande i Dalsland. **Vår Fågelv., 3** (4): 140–141, 1944.

KECK, WARREN N. The Mockingbird in Iowa. **Iowa Bird Life, 16** (2): 22–27, 1 pl., 1 map, June, 1946.

KELLY, DOUGLAS, ET AL. Devil Bird. **Loris, 4** (2): 332–333, June, 1946.

KENDEIGH, S. CHARLES. Breeding birds of the beech-maple-hemlock community. **Ecology, 27** (3): 226–245, figs. 1–3, July, 1946.

KIHLÉN, GUSTAF. Första fyndet av dvärguv (*Otus scops scops* L.) i Sverige. **Vår Fågelv., 2** (4): 116, 1943.

KILGORE, WILLIAM. A memorial sketch of Dr. Thomas Sadler Roberts. **Flicker, 18** (3): 47–51, 3 figs., Sept., 1946.

KINNEAR, N. B. Dr. Frank Chapman. **Nature, 156** (3973): 741–742, Dec. 22, 1945.

KJAER, THORVALD. Albino af Solsort (*Turdus merula*). **Dansk Ornith. For. Tids., 40** (2): 150–151, June, 1946.

KNOWLTON, GEORGE F. *Elateridae* eaten by Utah birds. **Jour. Econ. Ent., 38** (6): 707, Mar. 25, 1946.

KNOWLTON, GEORGE F. Grasshoppers eaten by Utah birds. **Jour. Kansas Ent. Soc., 19** (2): 71–72, Apr., 1946.

KNOWLTON, G. F., AND HARMSTON, F. C. Insect food of the Mountain Bluebird. **Jour. Econ. Ent., 39** (3): 384, Sept. 12, 1946.

KOMOROWSKI, GEORGE. A late Black-throated Green Warbler. **Proc. Linn. Soc. N. Y., 54–57**: 53, Sept. 16, 1946.

LABITTE, ANDRE. Au sujet de la disparition de la Huppe en Normandie et en Bretagne. **Oiseau, 15**: 68–71, 1945.

LABITTE, ANDRE. Observations sur le comportement de *Dryobates minor hortorum* (Brehm) 1831 à l'époque de sa reproduction dans le pays Drouais (partie nord du département d'Eure-et-Loir). **Oiseau, 15**: 118–129, 1945.

LACK, DAVID. Blackcock display. **Brit. Birds, 39** (9): 287–288, Sept. 2, 1946.

LACK, DAVID. Do juvenile birds survive less well than adults? **Brit. Birds, 39** (9): 258–264, Sept. 2, 1946.

LACK, DAVID. The taxonomy of the Robin *Erithacus rubecula* (Linn.). **Bull. Brit. Orn. Club, 56** (465): 55–65, May 9, 1946.

LA GORCE, JOHN OLIVER. Galapagos penguin chicks. **Aviculture, 16** (2): 21–23, May–Aug., 1946.

LANDAUER, WALTER, AND BLISS, C. I. Insulin-induced rumplessness of chickens. III. The relationship of dosage and of developmental stage at time of injection to response. **Jour. Exper. Zool., 102** (1): 1–22, figs. 1–4, June, 1946.

LATHAM, ROY. Eastern Long Island records of the Nighthawk. **Proc. Linn. Soc. N. Y. 54–57**: 50–51, Sept. 16, 1946.

LAURENT, GASTON. Sur le tambourinage du Pic cendre *Picus canus canus*. **Alauda, 13**: 123, 1941–1945.

LEE, HENRY F.; STAVITSKY, ABRAM B.; AND LEE, MARGARET P. A chick embryo technic for intravenous and chemotherapeutic studies. Proc. Soc. Exper. Biol. & Med., **61** (2): 143–149, figs. 1–6, Feb., 1946.

LEE, R. W. M. Wood-Sandpiper and other waders in Warwickshire. Brit. Birds, **39** (9): 285, Sept. 2, 1946.

LEHMANN V., F. C. Hallazgo de *Micrastur plumbeus* en Colombia. Caldasia, **3** (12): 225–228, Oct. 20, 1944.

LENDON, ALAN. Identification of the Glossy Cockatoo (*Calyptorhynchus lathami*) in South Australia. So. Austral. Ornith., **18** (1): 7, Mar., 1946.

LENDON, ALAN. Parakeet breeding results in Adelaide for 1945. Avic. Mag., **52** (4): 144–149, July–Aug., 1946

LEPIKSAAR, JOH. Iakttagelser av Kärrsångere (*Acrocephalus palustris* Bechst.) i Uppland. Vår Fågelv., **4** (4): 190, 1945.

LEWIS, LILLIAN BURWELL. A study of some effects of sex hormones upon the embryonic reproductive system of the White Pekin Duck. Physiol. Zool., **19** (3): 282–329, figs. 1–15, pls. 1–2, July, 1946.

LIGON, J. STOKLEY. History and management of Merriam's Wild Turkey. Univ. New Mex. Publ. Biol., **1**: i–x, 1–84, pls. 1–19, 2 maps, 1946.

LIGON, J. STOKLEY. Upland game bird restoration through trapping and transplanting. Univ. New Mex. Publ. Biol., **2**: i–x, 1–77, pls. 1–21, 1946.

LILJA, NILS. Från grågåsens (*Anser anser* L.) häckning vid Perstorps fiskdammar åren 1943–1945. Vår Fågelv., **5** (1): 9–15, figs. 1–3, 1946.—Summary in English.

LINCOLN, FREDERICK C. Keeping up with the waterfowl. Aud. Mag., **48** (3) sect. 1: 194–205, 7 figs., 10 maps, July–Aug., 1946.

LINDROTH, ARNE. Garfågeln i Sverige. Var Fågelv., **3** (4): 138–140, 1944.—Summary in English.

LINDROTH, STIG. Sent Kvarstannande salskrake. Vår Fågelv., **4** (2): 88, 1945.

LOW, JESSOP B., AND GAUFIN, DAVID M. An unusual flight of Sharp-tailed Grouse. Condor, **48** (4): 180, July 31, 1946.

LUNDBORG, O. A. Något om tallbitens (*Pinicola enucleator* L.) laten. Vår Fågelv., **4** (4): 192–193, 1945.

LUNDBORG, O. A. Rödstrupiga piplärkans (*Anthus cervinus*) sång. Vår Fågelv., **2** (3): 95–96, 1943.

LUNDEVALL, C. F., AND ROSENBERG, E. Norliga iakttagelser av näktergal (*Luscinia luscinia* L.) 1943. Vår Fågelv., **3** (1): 39, 1944.

LUNDGREN, SVANTE, ET AL. Rörsångaren (*Acrocephalus scirpaceus* Herm) häckar i nordligaste Uppland. Vår Fågelv., **2** (4): 117, 1943.

LUNDIN, ALLAN. Gräshoppsångare vid Hjälstaviken. Vår Fågelv., **1** (3): 46–47, 1942.

LUNDIN, ALLAN. Stjärtand häckande i insjöar i Uppland. Vår Fågelv., **3** (3): 110, 1944.

LUNDIN, ALLAN, AND FORSELIUS, STEN-ERIK. Videsparvar iakttagna i Uppland. Vår Fågelv., **3** (4): 141–142, 1944.

LUPIENT, MARY. American Egrets in Minnesota. Flicker, **18** (3): 63–64, Sept., 1946.

MACKWORTH-PRAED, C. W. Report on Heligoland. Bull. Brit. Orn. Club, **56** (465): 51–52, May 9, 1946.

MACKWORTH-PRAED, C. W., AND GRANT, C. H. B. On the generic classification of the Weaver-birds of eastern Africa placed in the genus *Ploceus* in Sclater's Syst. Av. Aethiop. 2, 1930, pp. 730–750. Ibis, **88**: 225–228, May 14, 1946.—*Xanthoploceus*

(genotype *Hyphantornis bertrandi* Shelley), *Melanoploceus* (genotype *Hyphantornis tricolor* Hartlaub), new genera.

MACKWORTH-PRAED, C. W., AND GRANT, C. H. B. On the races and distribution of the White-eyes belonging to the *Zosterops senegalensis* and *Zosterops virens* groups. Ibis, **88**: 236, May 14, 1946.

MACNAIR, R. Note on some birds not previously recorded from Eritrea. **Ibis, 88**: 233–235, May 14, 1946.

MADRAZO, F. BERNIS. Aves de Ledesma. Con algunas consideraciones sobre la avifauna Ibérica. Bol. Real Soc. Española Hist. Nat., **43** (3–4): 93–145, pls. 4–6, June 30, 1945.

MALMBERG, TORSTEN. Studier av häckfågelbeståndet i Pålsjö skog, Hälsinborg (cont.). Vår Fågelv., **3** (3): 81–99, 1 map, 1944.

MALMBERG, TORSTEN. Studier av häckfågelbeståndet i Pålsjö skog, Hälsinborg (concl.). Vår Fågelv., **3** (4): 113–131, 1944.—Summary in German.

MALMBERG, TORSTEN. Tofsvipan (*Vanellus vanellus* L.) påträffad i nordvästra Lappland. Vår Fågelv., **3** (4): 141, 1944.

MANNERS, EDWARD R. Shorebirds along the Delaware. **Cassinia, 35**: 23–34, figs. 1–4, June, 1946.

MARKLE, JESS M. A nesting site of the Lark Sparrow. **Condor, 48** (5): 245–246, figs. 51–53, Sept. 30, 1946.

MARSH, GORDON, AND BEAMS, H. W. In vitro control of growing chick nerve fibers by applied electric currents. Jour. Cell. and Compar. Physiol., **27** (3): 139–157, figs. 1–5, June, 1946.

MARTIN, CYRIL E. Water-Rail washing food. Brit. Birds, **39** (10): 320, Oct. 1, 1946.

MASON, T. H. The eyes of owls. Irish Nat. Jour., **8** (11): 395–396, July, 1946.

MATHEWS, G. M. Notes on petrels. Ibis, **88**: 400–402, July 19, 1946.

MATHEWS, G. M. The Emperor Penguin. Ibis, **88**: 400, July 19, 1946.

MATTINGLY, A. H. E. Display of the Lyrebird. Emu, **46** (1): 43, July 29, 1946.

MAURICE, H. G. Birds of Paradise in display. Zoo Life [London], **1** (1): 27–30, 2 figs., Spring, 1946.

MAYAUD, NOEL. Coup d'oeil sur l'apparition en France au cours de ses migrations du Jaseur de Bohême *Bombycilla garrulus garrulus* (L.). **Alauda, 13**: 72–89, 1941–1945.

MAYAUD, NOEL. La notion de poids et son utilité en ornithologie. **Alauda, 13**: 112–118, 1941–1945.

MAYAUD, NOEL. L'avifaune des Landes et de la région pyrénéenne occidentale (concl.). Oiseau, **15**: 49–67, 1945.

MAYAUD, NOEL. Le mélanisme chez la Fauvette à tête noire *Sylvia atricapilla* (L.). Alauda, **13**: 124–125, 1941–1945.

MAYAUD, NOEL. Les oiseaux et les pépins de raisin. **Oiseau, 15**: 168, 1945.

MAYAUD, NOEL. Les passages accidentels de Flamants roses *Phoenicopterus ruber roseus* Pallas, en France. Oiseau, **15**: 107–110, 1945.

MAYAUD, NOEL. Observations ornithologiques en Lyonnais (cont.). **Oiseau, 15**: 141–160, 1945.

MAYAUD, NOEL. Quelques données sur la migration des grands Bouvreuils en France. Alauda, **13**: 11–22, 1941–1945.

MAYNARD, VERA. Young birds returning to nest. Brit. Birds, **39** (10): 313, Oct. 1, 1946.

MAYR, ERNST, AND MOYNIHAN, MARTIN. Evolution in the *Rhipidura rufifrons* group. Amer. Mus. Novit., **1321**: 1–21, figs. 1–6, June 6, 1946.

McCaskill, L. W. Magpies in New Zealand. New Zeal. Bird Notes, **2** (1): 11, July, 1946.

McKeever, Christopher K. Data on some of the seabird colonies of eastern Long Island and New York City seabird colonies. Proc. Linn. Soc. N. Y., **54–57**: 44–47, Sept. 16, 1946.

McKeever, Christopher K. Further spread of the Prairie Horned Lark on Long Island. Proc. Linn. Soc. N. Y., **54–57**: 52–53, Sept. 16, 1946.

McNamara, Ellis. Swifts and the weather. Emu, **46** (1): 73–74, July 29, 1946.

McWilliam, John Morell. Birds of the Scar Rocks. The Wigtownshire gannetry. Trans. Buteshire Nat. Hist. Soc., **13**: 1–11, pls. 1–9, 1945.

Mead, John N. Cock Linnet feeding hen during incubation. Brit. Birds, **39** (8): 244, Aug. 1, 1946.

Meade, Gordon M. Suggestions to the field worker and bird bander. Avian pathology. Proc. Linn. Soc. N. Y., **54–57**: 36–38, Sept. 16, 1946.

Mees, G. F. Courtship feeding of Willow-Warbler. Brit. Birds, **39** (9): 280, Sept. 2, 1946.

Meiklejohn, R. F. Some observations on clutch size. Ibis, **88**: 382–386, July 19, 1946.

Meylan, Olivier. Remarques sur la question de la subspécificité. Alauda, **13**: 2–6, 1941–1945.

Meylan, Olivier. Sur une ponte de Pipit des buissons *Anthus trivialis* (L.) dans un nid de Pouillot siffleur *Phylloscopus sibilatrix* (L.), parasitée par le Coucou *Cuculus canorus* L. Alauda, **13**: 119–121, 1941–1945.

Miller, Alden H. Social parasites among birds. Sci. Monthly, **62** (3): 238–246, Mar., 1946.

Miller, Alden H. The identity of the Orange-crowned Warblers of the Santa Monica Mountains, California. Condor, **48** (4): 181, July 31, 1946.

Milne-Redhead, M. O. Unusual behaviour of Water-Rail. Brit. Birds, **39** (8): 253–254, Aug. 1, 1946.

Milon, Ph. Note sur une extension de l'habitat du Martin triste. Oiseau, **15**: 164–165, 1945.

Miscellaneous. A rookery census of the London area. London Nat., Suppl. **10**: 22–23, July, 1946.

Miscellaneous. Audubon field notes. Nesting season. Aud. Mag., **48** (5) sect. 2: 119–130, Sept.–Oct., 1946.

Miscellaneous. Audubon field notes. Spring migration. Aud. Mag., **48** (3) sect. 2: 107–118, July–Aug., 1946.

Miscellaneous. Breeding habits of Starlings. New Zeal. Bird Notes, **2** (1): 8–10, July, 1946.

Miscellaneous. Bull. Mass. Aud. Soc., Rec. New England Birds, **2** (4): 45–59, 2 figs., Apr., 1946.

Miscellaneous. Bull. Mass. Aud. Soc., Rec. New England Birds, **2** (6): 85–95, 1 fig., June, 1946.

Miscellaneous. [List of birds reported for 1944–45.] N. Z. Bird Notes, **1** (11): 121–139, May, 1946.

Miscellaneous. Migration of the Mallard (*Anas platyryncha*): recovery of ringed bird. Jour. Bombay Nat. Hist. Soc., **46** (1): 185, Apr., 1946.—At Nawabshah, Sind.

Miscellaneous. Ornithological report for Northumberland and Durham for 1945. Naturalist, **818**: 115–131, July–Sept., 1946.

MISCELLANEOUS. The heronries of the London area. **London Nat., Suppl. 10:** 23–24, July, 1946.

MISCELLANEOUS. White-winged Gulls. **Bull. Maine Aud. Soc. (mimeogr.), 2 (3):** 59–70, 1 fig. (cover), July, 1946.

MOLTONI, EDGARDO. Gli indicatoridi (*Indicatoridae*) esistenti nell' Africa Orientale Italiana. **Riv. Ital. Orn., 10** (1): 1–10, pl. 1 (col.), Jan., 1940.

MOLTONI, EDGARDO. Gli uccelli della Provincia di Aosta. **Atti. Soc. Ital. Sci. Nat., 82** (3–4): 205–308, pls. 3–5, figs. 1–12, 1 map.

MOLTONI, EDGARDO. L'etimologia ed il significato dei nomi vulgari e scientifici degli uccelli italiani (cont.). **Riv. Ital. Orn., 16** (3): 69–92, July, 1946.

MOLTONI, EDGARDO. Le Upupe (*Upupidae*) e le Upupe Arboree (*Phoeniculidae*) esistenti nell' Africa Orientale Italiana. **Riv. Ital. Orn., 10** (2): 75–92, pls. 9–10 (col.), Apr., 1940.

MOLTONI, EDGARDO. Ricomparse delle Cince more in Lombardia e regioni limitrofe nell' autunno-inverno 1945–46. **Riv. Ital. Orn., 16** (3): 122–124, July, 1946.

MOLTONI, EDGARDO. Un altro caso di nidificazione del Falco pecchiaiolo in Piemonte. **Riv. Ital. Orn., 16** (3): 130–131, July, 1946.

MONK, HARRY C. A kingbird roost. **Migrant, 17** (2): 17–19, June, 1946.

MONROE, BURT L., AND MENGEL, ROBERT M. The Evening Grosbeak in Kentucky. **Wilson Bull., 58** (2): 116, June, 1946.

MONSON, GALE. Notes on the avifauna of the Rio Grande Valley, New Mexico. **Condor, 48** (5): 258–241, Sept. 30, 1946.

MONSON, GALE. Road-Runner preys on Poor-Will. **Wilson Bull., 58** (3): 185, Sept., 1946.

MOORE, EARL N. The efficacy of recently developed sulfonamides against fowl typhoid. **Poultry Sci., 25** (4): 307–311, July, 1946.

MOORE, P. R., ET AL. Biological activity and metabolism of d, 1-0-heterobiotin in the chick. **Proc. Soc. Exper. Biol. & Med., 61** (2): 185–187, Feb., 1946.

MOORE, ROBERT T., AND BOND, RICHARD M. Notes on *Falco sparverius* in Mexico. **Condor, 48** (5): 242–244, Sept. 30, 1946.

MOREAU, R. E. More recoveries of White Storks in Tanganyika Territory. **Ibis, 88:** 238, May 14, 1946.

MORGAN, D. A. T. Some notes on birds in central Poland. **London Nat., 25:** 49–55, July, 1946.

MORRISON, A. F. Notes on the occurrence of migrant wheatears at Nairobi. **Jour. E. Africa Nat. Hist. Soc., 83–84** (3–4): 116–121, Jan., 1946.

MORRISON, KEN. Egrets near Hastings. **Flicker, 18** (3): 64, Sept., 1946.

MOSER, R. ALLYN. The genus Junco in Nebraska. **Nebr. Bird Rev., 14** (1): 1–6, Jan.–June, 1946.

MOUSLEY, HENRY. The Pied-billed Grebe, Florida Gallinule, and Eastern Mourning Dove in the Montreal district. **Provancher Soc. Annual Report: 48–58,** pls. 1–9, 1945.

MULLER, J. Enkele beschouwingen naar aanleiding van de vogelkolonisatie in de nieuwe Zuiderzeepolders. **Limosa, 17** (2–3): 55–63, Sept., 1944.

MUNRO, J. A. A record of the Black Pigeon Hawk nesting in British Columbia. **Condor, 48** (4): 182, July 31, 1946.

MURPHY, ROBERT CUSHMAN. Frank Michler Chapman. **Year Book Amer. Philos. Soc., 1945:** 354–361.—An obituary.

NICE, MARGARET MORSE. Jan Joost ter Pelkwyk, naturalist. **Chicago Nat., 9** (2): 27–35, 1 pl., Aug., 1946.—Obituary, also letters from Pelkwyk.

NICÉFORO, HERMANO. Notas sobre aves de Colombia. Caldasia, **3** (14): 367–395, Sept. 20, 1945.

NICHOLS, J. T. Manner of flight in petrels and albatrosses. Marine Life Occ. Pap., **1** (6): 19–22, June 15, 1946.

NICHOLSON, E. M. Some further notes from the North Atlantic. Brit. Birds, **39** (9): 265–274, 1 map, Sept. 2, 1946.

NICKERSON, MARK. Conditions modifying the expression of silver in the Silver Campine Fowl. Physiol. Zool., **19** (1): 77–83, pl. 1 (figs. 1–16), Jan., 1946.

NICKERSON, MARK. Relation between black and red melanin pigments in feathers. Physiol. Zool., **19** (1): 66–77, figs. 1–3, Jan., 1946.

NILSSON, NILS. Några iakttagelser över sidensvansen (*Bombycilla garrulus* L.) och dess häckning i Jämtland ar 1931. Vår Fågelv., **3** (4): 131–137, 1944.—Summary in English.

NILSSON, NILS. Några iakttagelser över graspetten (*Picus c. canus* Gmel.) i mellersta Jämtland. Vår Fågelv., **1** (1): 7–11, 1 fig., 1942.—Summary in English.

NINNI, E. Cattura di un *Phalacrocorax pygmaeus* Dumont in Provincia di Treviso. Riv. Ital. Orn., **10** (1): 55–58, Jan., 1940.

NORDQVIST, GUNNAR, ET AL. Iakttagelser av jorduggla (*Asio flammeus* Pontopp.) 1943. Vår Fågelv., **3** (2): 77–79, 1944.

NORÉHN, NILS. En översikt av den vita storkens (*Ciconia ciconia* L.) förekomst i Skåne under senare år. Vår Fågelv., **1** (2): 17–27, figs. 1–9, 1942.—Summary in German.

NORÉHN, NILS. 1943 ett dåligt storkår i Skåne. Vår Fågelv., **3** (1): 38, 1944.

NORÉHN, NILS. Storkstammen i Skåne under 1944. Vår Fågelv., **4** (1): 32–33, 1945.

NORÉHN, NILS. Storkstammen i Skåne, 1945. Vår Fågelv., **4** (4): 191–192, 1945.

NORRIS, C. A. Pochard breeding in Warwickshire. Brit. Birds, **39** (9): 282–283, Sept. 2, 1946.

ÖHMAN, LARS. Havssula iakttagen i Bohuslän. Vår Fågelv., **1** (3): 49, 1942.

ÖHRN, BERTIL. Ett relikt flyttningsstråk av arktiska vadare över Vättern. Vår Fågelv., **5** (1): 25–28, 1 map, 1946.—Summary in German.

ONSLOW, G. E. HUGHES. Movements of Bar-tailed Godwits on west coast of Scotland. Brit. Birds, **39** (9): 284–285, Sept. 2, 1946.

ONSLOW, G. HUGHES. Ravens nesting in a heronry. Brit. Birds, **39** (7): 212, July 1, 1946.

ORLANDO, CARLO. Crociere delle Pinete (*Loxia p. pityopsittacus* Borkhausen). Riv. Ital. Orn., **10** (2): 127–135, figs. 1–10, Apr., 1940.

ORLANDO, CARLO. Il Corvo Imperiale (*Corvus corax* L.). Riv. Ital. Orn., **10** (1): 22–40, figs. 1–13, Jan., 1940.

ORLANDO, CARLO. Osservazioni su un caso di nidificazione della Ballerina Gialla (*Motacilla c. cinerea* Tunst.). Riv. Ital. Orn., **10** (1): 51–55, figs. 1–3, Jan., 1940.

OTTERLIND, GUNNAR. En iakttagelse av lilla flugsnapparen (*Muscicapa p. parva* Bechst.) och en översikt av artens uppträdande i nordwästra Europa. Vår Fågelv., **3** (2): 41–74, 1944.—Summary in German.

OTTERLIND, GUNNAR. Gravanden (*Tadorna tadorna* L.) som inlandsfågel. Vår Fågelv., **5** (1): 29–35, 1946.—Summary in English.

PALM, BØRGE. Rødstrubet Piber (*Anthus cervinus* Pall.) i Danmark. Dansk Ornith. For. Tids., **40** (2): 151–152, June, 1946.

PALM, BØRGE. Sydvestsjaellandsk Fugleliv sommeren 1945. Dansk Ornith. For. Tids., **40** (2): 153–155, June, 1946.

PARKHURST, E. H. Yellow Bunting and Tree-Pipit laying in same nest. Brit. Birds, **39** (10): 314–315, Oct. 1, 1946.

PARRINDER, E. R., AND ASHBY, C. B. Birds in the London area, 1945. London Nat., Suppl. **10**: 2–22, pl. 1, July, 1946.—Report on bird life within twenty miles of St. Paul's Cathedral.

PAULIAN, PATRICE. Note sur le Chevalier Guignette *Actitis hypoleucos* (L.). Oiseau, **15**: 167–168, 1945.

PAYN, W. H. A new race of shrike from Algeria. Bull. Brit. Orn. Club, **66** (459): 15–16, Nov. 6, 1945.—*Telephonus senegalus meinertzhageni* (Ain Mokra, 40 Km. west of Bone, Algeria), new subspecies.

PEARCE, E. W. Redstart nesting in Co. Kerry. Brit Birds, **39** (10): 318, Oct. 1, 1946.

PEARSON, T. GILBERT. The Scaup Duck. Canad. Nat., **8** (4): 134–135, 1 pl. (col.), Sept.–Oct., 1946.

PERT, MAX MINOR. The Oregon Junco in Sonora, Mexico. Condor, **48** (4): 179, July 31, 1946.

PERSSON, CARL. Lekyttringar hos Kråkan (*Corvus c. cornix* L.). Vår Fågelv., **1** (2): 27–28, 1942.—Summary in English.

PFEIFFER, E. W. City-bred Duck Hawks. Nat. Hist., **55** (7): 338–340, 5 figs., Sept., 1946.

PHELPS, WILLIAM H. AND WILLIAM H., JR. Descripcion de cinco aves nuevas de Venezuela y comentarios sobre *Columbigallina passerina tortugensis* Fernández y *Machaeropterus regulus aureopectus* Phelps y Gilliard. Bol. Soc. Venez. Cienc. Nat., **65–66**: 149–161, 1 pl. (col.), 1 map, June, 1946.—*Synallaxis cinnamomea aveledoi* (Cubiro, Lara), *Certhiaxis cinnamomea marabina* (Mene Grande, Lago de Maracaibo, Zulia), *Microbates collaris paraguensis* (Salto María Espuma, Caão Espuma, Alto Río Paragua, Bolívar), *Sublegatus glaber tortugensis* (Garambeo, Tortuga Is.), *Coereba flaveola frailensis* (Puerto Real Is., Frailes Is.), new subspecies.

PHILLIPS, B. T. A bird photographer's musings from Kashmir. Jour. Bombay Nat. Hist. Soc., **46** (1): 89–103, pls. 1–8, Apr., 1946.

PHILLIPS, W. W. A. Osprey in Newara Eliya. Loris, **4** (2): 331–332, June, 1946.

PLATH, KARL. Avian old timers at Brookfield. Aviculture, **16** (1): 1–5, 1 fig., Jan.–Apr., 1946.

POSS, ULF, AND RAMEL, CLAËS. Ett par bofynd av sommargylling (*Oriolus o. oriolus* L.) i nordöstra Skåne och en översikt av artens upptradänte i Sverige. Vår Fågelv., **4** (2): 49–74, 4 figs., 1945.—Summary in German.

POSS, ULF, AND VON KNORRING, WILH. Iakttagelser av gräshoppsångare (*Locustella naevia*) 1944. Vår Fågelv., **4** (1): 34, 1945.

POSS, U., ET AL. Iakttagelser av rördrom (*Botaurus stellatus* L.). Vår Fågelv., **2** (4): 117, 1943.

POOR, HUSTACE H. Collecting Mallophaga. Proc. Linn. Soc. N. Y., **54–57**: 38–39, Sept. 16, 1946.

POOR, HUSTACE H. Predation by Grackles. Proc. Linn. Soc. N. Y., **54–57**: 54–55, Sept. 16, 1946.

POOR, HUSTACE H. The chickadee flight of 1941–1942. Proc. Linn. Soc. N. Y., **54–57**: 16–27, Sept. 16, 1946.

POTTS, NORMAN. Blue Duck (*Hymenolaimus malacorhynchus*) in Bay of Plenty. N. Z. Bird Notes, **2** (1): 7, July 1, 1946.

POWELL, H. Nuthatch feeding nestling Starlings. Brit. Birds, **39** (10): 316, Oct. 1, 1946.

PRIEUR DE LA COMBLE, J. Notes ornithologiques réalisées en captivité au camp de Soest en Westphalie, Oflag VI A. Oiseau, **15**: 94–106, 1945.

PRYOR, G. RONALD. Pied Flycatcher nesting in north Derbyshire. Brit. Birds, **39** (10): 317, Oct. 1, 1946.

R., N. D. L. Note sur les oiseaux de Saint-Pierre et Miquelon. Oiseau, **15**: 161–164, 1945.

RAGIONIERI, RENZO. L'*Accipiter gentilis trischittae* Ragion. Riv. Ital. Orn., **16** (3): 120–121, July, 1946.—New subspecies ('Alto Casentino—Toscana,' Italy).

RAMEL, CLAES, ET AL. Iakttagelser av gräshoppsångare (*Locustella naevia*) 1943. Vår Fågelv., **2** (4): 116–117, 1943.

RANKIN, JOHN S., JR. Helminth parasites of birds and mammals in western Massachusetts. Amer. Midl. Nat., **35** (3): 756–768, May, 1946.

REED, JOHN. Mud Island re-visited. Emu, **46** (1): 68–69, July 29, 1946.

RENSE, WILLIAM A. Astronomy and ornithology. Poplar Astron., **54** (2): 1–19, figs. 1–19, Feb., 1946.

RETT, E. Z. Record of another Condor death. Condor, **48** (4): 182, July 31, 1946.

RETT, E. Z. The Sage Grouse dance. Santa Barbara Mus. Nat. Hist., **21** (4–6): 39–45, Sept., 1946.

REYNOLDS, E. "Anting" by Magpies. Brit. Birds, **39** (10): 313, Oct. 1, 1946.

RICHDALE, L. E. Maori and Mutton-Bird. Wild Life [New Zeal., privat. publ.], **7**: 90–104, 8 figs., 1946.

ROBERTS, AUSTIN. Ringing of South African migratory birds. Ostrich, **17** (1): 44–49, June, 1946.

ROBERTS, E. L. Nocturnal hovering of Kestrel. Brit. Birds, **39** (7): 217–218, July 1, 1946.

ROBERTS, E. L. Unusual hunting behaviour of Peregrine Falcon. Brit. Birds, **39** (10): 318–319, Oct. 1, 1946.

ROOKE, K. B. Tuberculosis in wild birds. Fatal cases in a Barn-Owl and a Chaffinch. Ibis, **88**: 394–397, July 19, 1946.

ROSENBERG, ERIK. Några småfågelnotiser från Närke. Vår Fågelv., **4** (2): 75–79, 1945.—Summary in German.

ROSENBERG, ERIK. Vitstjärnig blåhake—ny för Sverige—iakttagen vid Oset. Vår Fågelv., **2** (3): 93, 1943.

ROSSI, COSIMO. Anomalia di colorazione su *Parus major major*, Linneo. Riv. Ital. Orn., **16** (3): 125–127, July, 1946.

ROSSI, COSIMO. Sull' abbondante apparizione di Colombacci (*Columba palumbus palumbus* L.) e di Colombelle (*Columba oenas oenas* L.) in territorio di Arsago (Varese). Riv. Ital. Orn., **16** (3): 124–125, July, 1946.

ROSTORFER, H. H., AND MC GEE, HELEN R. Some factors which decrease arterial saturation in bird malaria—ducks infected with *P. lophurae*. Proc. Soc. Exper. Biol. & Med., **62** (2): 151–154, figs. 1–3, June, 1946.

ROUGEOT, P. C. Notes sur quelques oiseaux de mer du Gabon. Oiseau, **15**: 111–117, 1945.

RUDEBECK, GUSTAF. Fältornitologiska Kännetecken på våra svenska vråkarter. Vår Fågelv., **4** (2): 79–87, figs. 1–16, 1945.—Summary in English.

RUDEBECK, GUSTAF. Preliminär redogörelse för fågeliakttagelser i Skanör och Falsterbo hösten 1942 (cont.). Vår Fågelv., **2** (1): 1–31, 1943.

RUDEBECK, GUSTAF. Preliminär redogörelse för fägeliakttagelser i Skanör och Falsterbo hösten 1942 (cont.). Vår Fågelv., **2** (2): 33–58, 1943.

RUDEBECK, GUSTAF. Preliminär redogörelse för fågeliakttagelser i Skanör och Falsterbo hösten 1942 (concl.). Vår Fågelv., **2** (3): 65–68, 1943.—Summary in German.

RUDEBECK, GUSTAF. Sträckande fjällpipare (*Charadrius morinellus* L.) iakttagna vid Skanör och Falsterbo. Vår Fågelv., **1** (1): 14–16, 1942.

RUDEBECK, GUSTAF. Sträck av vita storkar (*Ciconia c. ciconia* L.). Vår Fågelv., **1** (2): 28–29, 1942.

RUDEBECK, GUSTAF. Svart stork (*Ciconia nigra* L.) iakttagen i Skåne. Vår Fågelv., **1** (1): 16, 1942.

RUDEBECK, GUSTAF, AND SVÄRDSON, GUNNAR. En rubbning i flyttfågelsträcket våren 1944. Vår Fågelv., **5** (1): 16–25, 1946.—Summary in English.

RUSSELL, JACK. Flight speed of the Florida Cormorant. Florida Nat., **19** (4): 66, July, 1946.

RUTTLEDGE, ROBERT F. Female Ringed Plover performing scrape-ceremony. Brit. Birds, **39** (8): 251, Aug. 1, 1946.

RUTTLEDGE, ROBERT F. Report on observations of birds at Irish light-stations, 1945. Irish Nat. Jour., **8** (11): 382–387, July, 1946.

RUTTLEDGE, ROBERT F. White-tailed Eagle on Skelligs, off Co. Kerry. Irish Nat. Jour., **8** (11): 395, July, 1946.

RYES, B. H. Chaffinch's nests high in trees. Brit. Birds, **39** (9): 277, Sept. 2, 1946.

SALOMONSEN, FINN. Islom (*Colymbus immer*) fra Helgenaes. Dansk Ornith. For. Tids., **40** (2): 150, 1 fig., June, 1946.

SALOMONSEN, FINN. Sibirisk Hjejle (*Pluvialis dominicus fulvus* Gm.) ny for Sverige. Vår Fågelv., **4** (4): 174–178, 1 fig., 1945.—[First record for Sweden of the Asiatic Golden Plover.]—Summary in English.

SALOMONSEN, FINN. The Atlantic *Alcidae*. The seasonal and geographical variation of the auks inhabiting the Atlantic Ocean and the adjacent waters. K. Vet. O. Vitterh. Samh. Handl. F. 6, ser. B, **3** (5): 1–138, figs. 1–24, May 8, 1944.—*Cepphus grylle atlantis* (Göteborge skärgård, Bohuslän, Sween), *C. g. ultimus* (Frozen Strait, Melville Peninsula, Higharctic Canada), new subspecies.

SANDBERG, O. Sen Kull av svartmes (*Parus ater* L.). Vår Fågelv., **3** (2): 79–80, 1944.

SARGENT, MRS. M. C. Pacific gull color-banding project, 1942–1945. Condor, **48** (4): 179–180, July 31, 1946.

SCHELL, HENNING. Jagt-og Skovbrugsmuseets Fuglesamling. Dansk Ornith. For. Tids., **40** (2): 73–79, figs. 1–2, June, 1946.

SCHNEIDER, GUSTAV. *Rhinoplax vigil* (Forst.) und sein Nestling. Verhandl. Naturforsch. Gesell. Basel, **56** (1): 1–36, figs. 1–5a, 1945.

SCHORGER, A. W. Nest of the Magnolia Warbler at Trout Lake, Wisconsin. Wilson Bull., **58** (3): 186, Sept., 1946.

SCHORGER, A. W. Thure Kumlien and the early history of the Philadelphia Vireo. Wilson Bull., **58** (2): 113–116, June, 1946.

SCHORGER, A. W. Unusual display of the Myrtle Warbler. Wilson Bull., **58** (3): 186, Sept., 1946.

SCOTTI, PIETRO. Altri casi di nidificazione del *Circus pygargus* L. in Piemonte. Riv. Ital. Orn., **10** (1): 41–50, figs. 1–4, Jan., 1940.

SEDLEY, HENRY. Bullock's Oriole. Aviculture, 16 (2): 27–30, 1 fig., May–Aug., 1946.

SERLE, WILLIAM. *Hypochera camerunensis* Grote and *H. nigeriae* Alexander in Sierra Leone. Ibis, **88**: 405, July 19, 1946.

S[HAFTESBURY], A. D. Clement Samuel Brimley, 1863–1946. Chat, **10** (4): 62–64, 1 fig., Sept., 1946.—An obituary.

SIBLEY, CHARLES G. A new cuckoo-shrike from the Bismarck Archipelago. Condor **48** (4): 182, July 31, 1946.—*Edolisoma morio matthiae* (Emirau Island, St. Matthias Group), new subspecies.

SIBSON, R. B. Notes on two migrant waders near Auckland. New Zeal. Bird Notes, **2** (1): 4–7, July, 1946.—Turnstone, Golden Plover.

SIBSON, R. B., AND BULL, P. C. *Charadrius leschenaulti* again in N. Z. Emu, **46** (1): 76–77, July 29, 1946.

SICKER, H. L. Mating display in the Magpie. Emu, **46** (1): 75–76, July 29, 1946.

SIMPSON, GEORGE GAYLORD. Fossil penguins. Bull. Amer. Mus. Nat. Hist., **87** (1): 1–99, figs. 1–33, Aug. 8, 1946.

SKEAD, C. J. One year's census study of birds in 2½ acres of Albany Bushveld, April 1944 to March 1945. Ostrich, **17** (2): 87–100, June, 1946.

SMITH, E. H. Birds noted at Tooperang, Mount Compass. So. Austral. Ornith., **18** (1): 7, 9, Mar., 1946.

SMITH, HUBERT L. Rhapsody in red. Aviculture, **16** (1): 6–10, Jan.–Apr., 1946.—Concerning the House Finch.

SMITH, STUART. Stone-Curlew using autumn-type display in spring. Brit. Birds, **39** (8): 252–253, Aug. 1, 1946.

SNEYD-TAYLOR, J. Some birds observed at Port Alfred. Ostrich, **17** (2): 101–110, June, 1946.

SNYDER, L. L. Birds on a northern lake. Canad. Nat., **8** (4): 136–137, 1 pl., Sept.–Oct., 1946.

SODERBERG, RUDOLF. Originella svalbon. Vår Fågelv., **1** (1): 11–14, figs. 1–3, 1942.—Summary in English.

SOLL, JEROME. Rare gulls at the Narrows, Brooklyn, in the winter of 1943–44. Proc. Linn. Soc. N. Y., **54–57**: 40–42, Sept. 16, 1946.

SOMANADER, S. V. O. The Ceylon Grebe. Loris, **4** (2): 312–316, 4 figs., June, 1946.

SOMMANI, ERNESTO. Osservazioni sull' irregolare arrivo dei Balestrucci (*Mantula urbica* L.) a Roma durante il Marzo dei corrente anno (1946). Riv. Ital. Orn., **16** (3): 127–129, July, 1946.

SOUTHERN, H. N. The inheritance of head colour in the Gouldian Finch (*Poephila gouldiae* Gould). Avic. Mag., **52** (4): 126–135, July–Aug., 1946.

SOUTHERN, JOHN. Display flight of Marsh-Tit. Brit. Birds, **39** (10): 316–317, Oct. 1, 1946.

SOUTHERN, JOHN B. Unusual feeding behaviour of tits. Brit. Birds, **39** (7): 214, July 1, 1946.

SPENCER, K. G. Kestrels capturing birds in full flight. Brit. Birds, **39** (7): 217, July 1, 1946.

STAMBERG, OLOF E.; PETERSEN, CHARLIE F.; AND LAMPMAN, C. E. Effect of riboflavin intake on the content of egg whites and yolks from individual hens. Poultry Sci., **25** (4): 320–326, figs. 1–2, July, 1946.

STATON, J. Chaffinch and Tree-Sparrow wading and probing for food. Brit. Birds, **39** (10): 314, Oct. 1, 1946.

STATON, J. Rose-coloured Starling in Nottinghamshire. Brit. Birds, **39** (10): 313–314, Oct. 1, 1946.

STEVENSON, JAMES O. An old account of the Whooping Crane in Nebraska. Nebr. Bird Rev., **14** (1): 21–22, Jan.–June, 1946.

STEVENSON, JAMES O. Migration of the Anhinga in Texas. Wilson Bull., **58** (3): 184–185, Sept., 1946.

STEVENSON, JAMES O., AND GRIFFITH, RICHARD E. Winter life of the Whooping Crane. Condor, **48** (4): 160–178, figs. 38–42, July 31, 1946.

STONOR, C. R. Field notes on the birds of the Anamalai Hills (Cochin). Jour. Bombay Nat. Hist. Soc., **46** (1): 119–125, Apr., 1946.

STONOR, C. R. The Ashy Swallow-Shrike (*Artamus fuscus*) in the Nilgiris. Jour. Bombay Nat. Hist. Soc., **46** (1): 184, Apr., 1946.

STOTT, KEN, JR. A first breeding. Aviculture, **16** (1): 13, 1 fig., Jan.–Apr., 1946.—Pied Geese.

[STREET, J. FLETCHER]. Four days with J. Fletcher Street. Cassinia, **35**: 1–11, June, 1946.—From his Journals.

SVARDSON, GUNNAR. Bigami hos gronsangaren (*Phylloscopus sibilatrix* Bechst.). Vår Fågelv., **3** (3): 106–109, 1944.—Summary in English.

SVARDSON, GUNNAR. En invasion av snatterand (*Anas strepera* L.). Vår Fågelv., **2** (4): 97–108, 1943.—Summary in German.

SVARDSON, GUNNAR. Några tidiga sträckobservationer från östra Skåne. Vår Fågelv., **2** (4): 113–115, 1943.—Summary in German.

SVARDSON, GUNNAR. Ny häckplats för nötkråka i Uppland. Vår Fågelv., **1** (2): 29, 1942.

SVÄRDSON, GUNNAR. Vaktelns (*Coturnix coturnix* L.) förekomst i Sverige. Vår Fågelv., **3** (1): 1–32, 1944.—Summary in German.

SVARDSON, GUNNAR, ET AL. Tidig häckning av ängpiplärka, stjärtmes, kungsfågel och kattuggla. Vår Fågelv., **2** (3): 94, 1943.

SVENSSON, STURE. Tidig häckning av morkulla (*Scolopax rusticola* L.). Vår Fågelv., **4** (4): 193, 1945.

SWANBERG, OLAF. Har gräshoppsångaren (*Locustella naevia* Bodd.) häckat i Västergotland? Vår Fågelv., **1** (4): 55–59, 1942.—Summary in English.

SWANBERG, P. O. Ängshök vid Hornborgasjön. Vår Fågelv., **2** (1): 31, 1943.

SWANBERG, P. O. Häckande gräshoppsångare (*Locustella n. naevia* Bodd.). Vår Fågelv., **4** (4): 149–174, figs. 1–3, 2 pls., 1945.—Summary in English.

SWANBERG, P. O. Ovanliga gäster i Hornborgasjön; grågås, spetsbergsgås och mindre sångsvan. Vår Fågelv., **2** (2): 62–63, 1943.

TAIBEL, ALULA M. Osservazioni sulla riproduzione in cattività di *Crax g. globicera* L. Riv. Ital. Orn., **10** (2): 93–126, figs. 1–13, Apr., 1940.

TAMINO, GIUSEPPE. Il nuoto dell' otaria e del pinguino. Natura, (Milano), **34** (1): 14–24, figs. 1–4, 1943.

TEKKE, M. J. Een nieuw broedgeval van de hop, *Upupa e. epops* L. in Nederland. Limosa, **16** (3): 112–114, Sept., 1943.

TEN KATE, C. G. B. Ornithologie van Nederland, 1944. Limosa, **17** (2–3): 68–83, Sept., 1944.

TEN KATE, C. G. G. Terugvondsten van in het buitenland geringde vogels, 18. Limosa. **17** (2–3): 94–97, Sept., 1944.

TERRES, JOHN K. On the trail of Congo Jim. Aud. Mag., **48** (3) sect. 1: 230–238, 8 figs., July–Aug., 1946.—Biographical sketch of Dr. J. P. Chapin.

TEST, CHARLES DARWIN. Exploring nests of Golden Eagles. Aud. Bull. [Illinois], **59**: 1–8, 4 figs., Sept., 1946.

THOMAS, RUTH HARRIS. A study of Eastern Bluebirds in Arkansas. Wilson Bull., **58** (3): 143–183, fig. 1, Sept., 1946.

THOMAS, RUTH HARRIS. Catbird "anting" with a leaf. Wilson Bull. **58** (2): 112, June, 1946.

THORUP, NIELS. Lagttagelse af Foraars-og Efteraarstraek over Sydsjaelland og Møen. Dansk Ornith. For. Tids., **40** (2): 108–120, figs. 1–3, June, 1946.—Summary in English.

TICEHURST, N. F. Purple Sandpipers using elevated perches. Brit. Birds, **39** (7): 222, July 1, 1946.

TOLMAN, RINKE. De invasie van de pestvogel, *Bombycilla garrulus* (L.), in Nederland (1943–44). Limosa, **17** (2–3): 63–68, Sept., 1944.

TROUCHE, LUCIUS. Contribution à l'étude biologique de la Bouscarle de Cetti. Alauda, **13**: 27–71, 1941–1945.

T[UCKER], B. W. Studies of some species rarely photographed. 6. The Griffon Vulture. Brit. Birds, **39** (9): 275, pls. 30–35, Sept. 2, 1946.—Photographs by R. Atkinson and G. Yeates.

TULLY, H., AND TEIDEMAN, S. J. Courtship feeding of Greenfinch. Brit. Birds, **39** (7): 212–213, July 1, 1946.

TURNER, LESLIE L. Little Bitterns in Lancashire. Brit. Birds, **39** (7): 218–219, July 1, 1946.

UNDERWOOD, C. E. The Scarlet-backed Flower Pecker (*Dicaeum cruentatum*). Jour. Bengal Nat. Hist. Soc., **20** (4): 128–129, Apr., 1946.

VAN DEN AKKER, JOHN B. A Mountain Plover from Utah. Condor, **48** (5): 246, Sept. 30, 1946.

VANDERLAAN, W. P., AND BISSELL, A. The influence of selected goitrogenic compounds on the thyroid gland of the chick. Endocrinol., **38** (5): 308–314, May, 1946.

VAN IJZENDOORN, A. J. L. Agressieve boerenzwaluwen (*Hirundo rustica*). Limosa, **17** (2–3): 101, Sept., 1944.

VAN IJZENDOORN, A. L. J. Grutto's (*Limosa limosa*) op de trek reeds gepaard? Limosa, **16** (3): 116, Sept., 1943.

VAN IJZENDOORN, A. J. L. Nog enige waarnemingen over het gedrag van de fuut (*Podiceps cristatus*) in de voortplantingstijd. Limosa, **17** (2–3): 99–100, Sept., 1944.

VAN IJZENDOORN, A. L. J. Over de balts bij de fuut (*Podiceps cristatus*). Limosa, **16** (3): 116, Sept., 1943.

VAN IJZENDOORN, A. L. J. Vreemd gedrag van een merel (*Turdus merula*). Limosa, **16** (3): 117, Sept., 1943.

VAN MALSSEN, J. F. M. Nogmaals *Sylvia melanocephala*. Limosa, **17** (2–3): 97–98, Sept., 1944.

VAN MARLE, J. G. Een oude terugmelding van den reiger (*Ardea cinerea*). Limosa, **16** (3): 116, Sept., 1943.

VANNUTELLI, LAMBERTO. Circa fattori che influenzano i colori degli uccelli ed alcuni risultati sperimentali (cont.). Riv. Ital. Orn., **16** (3): 114–119, July, 1946.

VAN ROSSEM, A. J. An isolated colony of the Arizona Cardinal in Arizona and California. Condor, **48** (5): 247–248, Sept. 30, 1946.

VAN ROSSEM, A. J. Notes on distribution and color of the Mexican Turkey Vulture. Condor, **48** (4): 180–181, July 31, 1946.

VAN SOMEREN, V. G. L. Notes on East African birds. Bull. Brit. Orn. Club, **66** (459): 9–13, Nov. 6, 1945.—*Phyllastrephus terrestris bensoni* (Lower Meru Forest, 4,000 feet), *Stilbopsar kenricki bensoni* (Mount Kenya, 6,500 feet), new subspecies.

VAN SOMEREN, VERNON D. The dancing display and courtship of Jackson's Whydah (*Coliuspasser jacksoni* Sharpe). Jour. E. Africa Nat. Hist. Soc., **83–84** (3–4): 131–141, figs. 1–9, Jan., 1946.

VAN TYNE, JOSSELYN. Starling and Brown Thrasher stealing food from Robins. Wilson Bull., **58** (3): 185, Sept., 1946.

VAN TYNE, JOSSELYN, AND TRAUTMAN, MILTON B. The Red-winged Blackbird of Yucatan. Occ. Pap. Mus. Zool., Univ. Mich., **496**: 1–3, Apr. 18, 1946.—*Agelaius phoeniceus pallidulus* (3 km. south of Progreso, Yucatan), new subspecies.

VASU, V. M. Some common birds of Kathiawar—absent or rare in Kutch. Jour. Bombay Nat. Hist. Soc., **46** (1): 187–189, Apr., 1946.

VINCENT, ALFRED W. On the breeding habits of some African birds (cont.). Ibis, **88**: 306–326, July 19, 1946.

VON BOETTICHER, HANS. Die Verwandtschaftsbeziehungen der afrikanischen Papageien (*Poicephalus* und *Agapornis*). Zool. Anz., **145** (1–4): 10–27, figs. 1–2, Oct., 1944.

VON BOETTICHER, HANS. Zur Gattungssystematik der echten Falken. Zool. Anz., **145** (1–4): 1–10, Oct., 1944.

VOOUS, K. H., JR. Een systematische studie van Nederlandse rietganzen, *Anser fabalis* (Latham). Limosa, **17** (2–3): 41–55, figs. 1–4, Sept., 1944.—Summary in English.

WAGNER, HELMUTH O. Food and feeding habits of Mexican hummingbirds. Wils. Bull., **58** (2): 69–93, pl. 2, June, 1946.

WAGNER, HELMUTH. Observaciones sobre el comportamiento de *Chiroxiphia linearis* durante su propagacion. Anal. Inst. Biol. (México), **16** (2): 539–546, pl. 1, figs. 1–2, 1945.

WAHLSTRÖM, GUNNAR. Vittrut och vitvingad trut på Strömmen i Stockholm 1946. Vår Fågelv., **5** (1): 36–37, 4 figs., 1946.

WALKINSHAW, LAWRENCE H., AND BAKER, BERNARD W. Notes on the birds of the Isle of Pines, Cuba. Wilson Bull., **58** (3): 133–142, figs. 1–4, pl. 4, Sept., 1946.

WARREN, JOEL, AND HOUGH, RALPH G. A vaccine against Japanese B encephalitis prepared from infected chick embryo. Proc. Soc. Exper. Biol. & Med., **61** (2): 109–113, Feb., 1946.

WATERHOUSE, M. J. Chaffinch song with terminal click in England. Brit. Birds, **39** (8): 244, Aug. 1, 1946.

WATSON, ADAM. Display of Blackbird. Brit. Birds, **39** (9): 280–281, Sept. 2, 1946.

WATSON, ADAM. Display of Sand-Martin. Brit. Birds, **39** (9): 282, Sept. 2, 1946.

WATSON, ADAM. Glaucous Gulls in N. E. Scotland. Brit. Birds, **39** (8): 253, Aug. 1, 1946.

WEBBER, LEONARD C. Ten years with the Painted Finch and some historical notes (*Caylena picta*). Avic. Mag., **52** (4): 149–158, July–Aug., 1946.

WERNER, RAY C. Abnormal albino White-throated Sparrow taken at Atlanta. Oriole, **11** (3): 54–55, July, 1946.

WEST, R.; SPENCER-SCHRADER, R. H.; AND PHILLIPS, W. W. A. Ceylon Bird Club notes. Loris, **4** (2): 329–331, June, 1946.

WETMORE, ALEXANDER. The birds of San José and Pedro Gonzalez Islands, Republic of Panama. Smiths. Misc. Coll., **106** (1): 1–60, pls. 1–4, Aug. 5, 1946.

WHEELER, ALWYNE C. Courtship feeding of Greenfinch. Brit. Birds, **39** (10): 314, Oct. 1, 1946.

WHITE, C. M. N. A note on the larks of the *Mirafra rufocinnamomea* group. Bull. Brit. Orn. Club, **66** (459): 13–15, Nov. 6, 1945.—*M. r. iwenarum* (between the Kasisi and Litapi Rivers, West Balovale district, Northern Rhodesia), new subspecies.

WHITE, C. M. N. The ornithology of the Kaonde-Lunda Province, Northern Rhodesia—part 4 (concl.). Ibis, **88**: 206–224, May 14, 1946.—*Ortygospiza atricollis minuscula* (Balovale), *Anomalospiza imberbis mukandakundae* (Balovale), new subspecies.

WHITE, COURTLAND Y. A Whitman ornithology. Cassinia, **35**: 12–22, June, 1946.

WHITLOCK, F. LAWSON. Sooty Albatross at Bunbury. Emu, **46** (1): 75, July 29, 1946.

WHITTELL, H. M., AND C[HISHOLM], A. H. Hybrid between Lyrebird and common fowl. Victor. Nat., **63** (2): 47, June, 1946.

WIGSTEN, HALDUR. Blåkråkan (*Coracias garrulus* L.) som häckfågel på Fårön. Vår Fågelv., **1** (4): 49–54, 1 fig., 1942.—Summary in English.

WILEY, A. J. Nest of the Grey-capped Warbler (*Eminia lepida*). Jour. E. Africa Nat. Hist. Soc., **83–84** (3–4): 162, Jan., 1946.

WILLIAMS, KENNETH J. The birds of Hawaii National Park and vicinity. Hawaii Nat. Park Nat. Hist. Bull. (mimeogr.), **1**: 1–25, Oct., 1936.

WILLIAMS, M. Y. Notes on the vertebrates of the southern plains of Canada, 1923–1926. Canad. Field Nat., **60** (3): 47–60, May–June, 1946.

WILLIAMS, R. E. Remarkable behaviour of Blackbird. Brit. Birds, **39** (10): 318, Oct. 1, 1946.

WILLIAMS, RALPH B., AND MATTESON, CLYDE P., JR. Wyoming hawks. Wyo. Wild Life, **10** (7): 8–12, 8 figs., July, 1946.

WILSON, J. M. Bird watching on the Berwickshire coast. Bird Notes & News, **12** (3): 35–36, Autumn, 1946.

WIMAN, C. Lavskrika (*Cractes infaustus* L.) skjuten i trakten av Kristinehamn. Vår Fågelv., **2** (3): 94–95, 1943.

WING, LEONARD. Drumming flight in the Blue Grouse and courtship characters of the *Tetraonidae*. Condor, **48** (4): 154–157, fig. 37, July 31, 1946.

WODZICKI, K. A. The Waikanae estuary—an ecological survey of New Zealand birds. Emu, **46** (1): 3–43, figs. 1–2, 10–15, pls. 2–4, July 29, 1946.

WOOD, R. L. Proximity of occupied Kingfisher nests. Proc. Linn. Soc. N. Y., **54–57**: 51–52, Sept. 16, 1946.

WOOD, ROBERT S. Display of Cuckoo. Brit. Birds, **39** (8): 249, Aug. 1, 1946.

WOODBURY, ANGUS M.; BEHLE, WILLIAM H.; AND SUGDEN, JOHN W. Color-banding California Gulls at Great Salt Lake, Utah. Bull. Univ. Utah, **37** (3): 1–15, figs. 1–2, June 30, 1946.

WRIGHT, A. A. Blackcap imitating notes of Nuthatch. Brit. Birds, **39** (8): 247, Aug. 1, 1946.

YAMASHINA, YOSHIMARO. Ecuador, *Chloroceryle americana*. Bull. Biogeogr. Soc. Japan, **13** (19): 145–146, Oct., 1943.—*C. a. ecuadorensis* (Esmeraldas, Ecuador), new subspecies.

YAMBERT, WILLIAM DALE. Pileated Woodpecker's reaction to a hawk. Migrant, **17** (2): 27, June, 1946.

YEATES, G. K. Birds of the Broads—Hickling and Horsey, the Norfolk sanctuaries and nesting haunts of Britain's rarest birds. Field, **187** (4875): 606–608, 13 figs., June 1, 1946.

YOUNG, CHARLES G. Notes on some birds of the Cameroon Mountain District. Ibis, **88**: 348–382, July 19, 1946.

ZIMMER, JOHN T. Frank Michler Chapman. Amer. Nat., **80** (793): 476–481, 1 fig., July–Aug., 1946.—An obituary.

ZIMMER, JOHN T. Frank Michler Chapman 1864–1945. Science, **104** (2694): 152–153, Aug. 16, 1946.

CORRESPONDENCE

"New Species of Birds Described from 1938 to 1941"

The Editor of The Auk:—In The Auk, 60, 249–262, 1943, Zimmer and Mayr have, in their list of recently described birds, made some comments under the various new names. These comments, and in some cases decisions, are undoubtedly most useful, especially where it is known for certain that the new names given are synonyms of species already discovered. If the authors had left it at that no objections could be raised, but this unfortunately is not so, and they have in some cases come to conclusions which cannot be allowed to pass without comment.

Page 255. *Treron pembaensis* Pakenham. The authors definitely state this to be a race of *Treron australis* (Linnaeus). Before this bird was given a name it was very carefully compared by the staff and all workers in the Bird Room of the British Museum, not only with *T. australis* but with all the Fruit Pigeons of Africa and Asia, and it was decided that it must be described as a new species and not as a race. *T. australis* was naturally one of the first species to which it was compared and from which it differs in having the whole head, neck, chest to belly and tail gray, the latter with lighter gray ends; mantle and scapulars, inner secondaries and wing coverts, but not the wing shoulder, olive green. It therefore resembles *Treron australis, Treron wakefieldi* and *Treron delalandii* only in the vinous wing shoulder, gray under wing coverts, and the pattern of the feathers of the lower belly, thighs and under tail coverts. It is as different from the eastern African mainland Fruit Pigeons as *Treron s. thomae* is from the western African mainland Fruit Pigeons.

Page 256. *Alethe lowei* Grant & Praed. The authors state that this is a race of *Cossypha anomala* (Shelley). This specimen was compared to all known *Cossypha, Alethe* and *Sheppardia*, etc., by myself and others. I may say that the naming of this bird was by no means hurried, and it was looked at and compared with other genera and species over a period of at least two years. It has nothing to do with *Alethe anomala*, being much smaller, having a much shorter bill; is above more olive with no chestnut wash; tail more olive not nearly so chestnut; no gray stripe over eye; no gray on malar region; no gray edging to wing feathers, coverts or edge of wing; no white throat and not gray below, and, as stated in the description, is nearer to *Alethe montana* Reichenow (which is not a race of *A. anomala*) but it is not even a race of this species as it has a smaller bill; is altogether a smaller bird; tail is more olive; there is no chestnut spot in front of eye, and the underparts are brown not olivaceous.

As stated under 'Remarks' in Bull. Brit. Orn. Club, 41: 61, 1941, its general appearance is so close to *Sheppardia sharpei sharpei* (Shelley) that it can be mistaken for a *Sheppardia* and was so recorded by Lynes in Jour. für Orn., 82: 82, 1934. .

Page 256. *Sheppardia bensoni* Kinnear. Macdonald took considerable trouble and spent much time on this group, and I can assure Messrs. Zimmer and Mayr that it is, and not 'apparently,' a race of *Sheppardia gunningi* Haagner, having the gray primary coverts and gray outer edges of outer primaries of that species as given by Macdonald in the Ibis, 14 (4): 667, 1940.

Page 256. *Scepomycter winifredae* Moreau. The authors have tentatively placed this in the genus *Mixornis* on Dr. Chapin's remark that it reminded him 'superficially' of that genus. This specimen was not only most carefully examined by all in the Bird Room of the British Museum but was sent to the Berlin and Tervueren museums for Drs. Stresemann's and Schouteden's opinions. In consultation with the staff and other workers in the Bird Room it has now been compared to *Mixornis* from which it differs in the hooded nostril; longer tarsus; narrower tail feathers; no indication of streaks on throat; first primary broader and tip less pointed. It has also been compared with *Zosterornis* with which it agrees in the hooded nostril, but from

which it differs in the shorter tail and narrower tail feathers; bill longer and narrower; first primary broader and tip less pointed. It is undoubtedly closely allied to *Artisornis* but cannot remain in that genus as it has a hooded nostril and a longer tail. Moreau in Bull. Brit. Orn. Club, 64: 44, 1946, has now described the adult male and this shows that the color pattern is very different from that of *Mixornis* and has nothing whatever to do with that genus.

Page 260. *Zosterops chyuluensis* van Someren. This is not considered to be a race of *Zosterops virens* Sundevall. Both Messrs. Zimmer and Mayr appear to have overlooked van Someren's grouping in Jour. E. Afr. & Uganda Nat. Hist. Soc., 14: 117, 1939. —C. H. B. Grant, *8, Cornwall Gardens Court, 50, Cornwall Gardens, London, S. W. 7.*

The Editor of The Auk.—In the paper referred to by Captain Grant[1] all remarks on Old World birds were made by Mayr, as is stated in an introductory paragraph, while Dr. Zimmer discussed the New World species. The undersigned therefore takes the sole responsibility for the following remarks.

Page 255. *Treron pembaensis* Pakenham. Contrary to Captain Grant's assertion, I merely stated: "No character is given in the original description which would militate against considering this form a race of *Treron australis*." Captain Grant's comments do not alter the validity of this statement. It is, of course, known that the species criteria of some ornithologists are different from those of others. I might add that the specific status of several of the mainland *Treron* is equally open to question, but *australis* is in any case the oldest name.

Page 256. *Alethe lowei* Grant and Mackworth-Praed. Only a single female is known. I therefore stated: "Whether *Cossypha anomala lowei* is the correct nomenclature remains to be seen . . . The taxonomy of these thrushes is still unsettled in regard to the validity of genera as well as species. A complete revision is needed, based on more material than is available at present." No such revision has yet been published since the above remarks were written.

Page 256. *Sheppardia bensoni* Kinnear. When the two ornithologists of the British Museum, Kinnear and Macdonald, disagree with each other whether a given form should be considered a species or a subspecies, the outsider can only state that the latest discussant appears to be right and refer to his paper, which I did. Since Captain Grant also agrees with this decision, I do not quite understand what his objections are.

Page 256. *Scepomycter winifredae* Moreau. I am sorry to disagree with Captain Grant, but I still consider it bad taxonomic practice to name a new genus on the basis of a single immature specimen in such a notoriously difficult group as that involving the borderline genera between the warblers and the babblers.

Page 260. *Zosterops chyuluensis* van Someren. It is surprising that Captain Grant should want to uphold the specific distinctness of this form since van Someren himself conceded the purely provisional nature of the specific designation. There is nothing in van Someren's grouping to which Captain Grant refers which would indicate that groups 1 and 2 are not conspecific with *virens*.

Finally, I would like to state that in a review like that prepared by Dr. Zimmer and myself, one is forced to make certain decisions on the basis of the published data. Additional information may necessitate modifications. Colonel Meinertzhagen, for example, has communicated to me unpublished evidence, not contained in the rather meager original description of *Sylvia ticehursti* Meinertzhagen, which indicates that this form is a valid species.—E. Mayr, *American Museum of Natural History, New York, N. Y.*

[1] Mayr, E., and Zimmer, J. T. New species of birds described from 1938 to 1941, The Auk, 60: 249-262, 1943.

OBITUARIES

DAVID CLARK HILTON.—In the death of Dr. David Hilton on December 12, 1945, the medical profession lost a celebrated figure, the nation an outstanding citizen, ornithology an enthusiastic devotee, and a host of men, women, and children a beloved friend. Not many persons knew Dr. Hilton as an ornithologist. He was so busy as a surgeon that he had comparatively little time for birds, especially during his latter years. Yet so enthusiastic was he as a field observer that, visiting southeastern México on a vacation from January to mid-March, 1944, he kept a careful list of all the birds he encountered. This list he sent me in November of the same year, asking me to check certain of his identifications. How his letter served to remind me of a certain morning almost forty years before, when that same Dr. Hilton, our family doctor, talked with me on our front steps about the economic value of the birds of prey. I had in my lap a dead Marsh Hawk—victim of some neighbor lad's .22 rifle. One of Dr. Hilton's hands gripped his physician's satchel; the other spread the nearer of the hawk's wide wings.

David Clark Hilton, youngest son of John Bulin Whitehead and Mary Elizabeth Redgate Hilton, was born on the Hilton family homestead farm near Dorchester, Nebraska, on April 22, 1877. His early childhood, and summers of his teen years, were spent on this farm, which still is in the possession of the family. At an early age he manifested intense interest in the natural sciences, a fact which became the more apparent while he was attending the district schools in Saline County, Nebraska (up to 7th grade), the Brown Grammar School (7th and 8th grades), and West Division High School (Chicago). As an undergraduate he attended the University of Nebraska, from which institution he was graduated with the Bachelor of Arts degree in 1900. Throughout his school career he was an outstanding student. In 1901 he received from the University of Nebraska a Master of Arts degree in Embryology and was inducted into the honorary Society of the Sigma Xi. His distinguished work in embryology was no mean accomplishment in view of the fact that he was at the same time working toward his Doctor of Medicine degree, which degree was awarded him by Rush Medical College of the University of Chicago in 1903. While in Chicago he interned at St. Mary's Hospital and served as pathologist at the United Hebrew's Charities Dispensary.

Establishing himself as a practising physician and surgeon in Lincoln, Nebraska, he launched upon a full and useful career, heading the Science Department of the now defunct Cotner University in 1904–1905; being Demonstrator in Anatomy at the University of Nebraska, 1903–1905; becoming an attending surgeon at St. Elizabeth's Hospital in 1905 and Chairman of Surgery at Bryan Memorial Hospital in 1926. The last two positions he held until the time of his death. He did postgraduate work in Vienna and Paris in 1927. He was consultant in General Surgery for the U. S. Veterans' Bureau Hospital from 1930 to 1942. During the First World War he served his country as a Captain in the Medical Corps. His efforts in bolstering national defense at a time when our citizenry were being drugged by the insidious propaganda of the pacifists and isolationists were untiring. With Dr. H. Winnett Orr he organized the 110th medical regiment of the Nebraska National Guard, of which outfit he was Commanding Officer from 1925 to 1940. He was Division Surgeon of the 35th Division of the National Guard from 1927 to 1940. He was a graduate of the Command and General Staff School of the United States Army, being retired in September, 1940, as a Brigadier General of the line. His interest in military medicine took him to Warsaw, Poland, as American delegate to the 5th

International Congress of Military Medicine and Pharmacy in 1927, and to England, as delegate to the 6th Congress in 1929. He was awarded the Cross of the Army Medical School by the government of Poland in 1927. He became a fellow of the American College of Surgeons in 1915. He was a member of the American Medical Association, Sons of the American Revolution, American Legion, Society of Colonial Wars, American Microscopical Society, Lancaster County (Nebraska) Medical Society, Interprofessional Men's Institute, Nebraska Genealogical Society, Lincoln Chamber of Commerce, and the Acacia and Sigma Xi fraternities. Unusually devoted to the Masonic Order, he became a 33rd degree Mason, a Knight Templar, and a Member of the Red Cross of Constantine. An active and devout communicant of the church, he was for many years the Chief Warden of St. Matthew's Episcopal Church of Lincoln, and served on several important Episcopal Commissions as an appointee of the Bishop of Omaha. On August 23, 1900, he was married to Sarah Luella O'Toole. He leaves, besides his wife, three children: Mrs. Blossom Virginia Gish of Texas, Mrs. Ruth Burgert of Chicago, and Dr. Hiram David Hilton of Lincoln, himself an accomplished surgeon.

David Clark Hilton was the author of numerous papers on medical and military matters, but he published only a few ornithological articles. The best known of these is, perhaps, his 'Birds of the Ft. Leavenworth Military Reservation' (*Wilson Bulletin*, 32, no. 3, 1920). He was an Associate of the American Ornithologists' Union from 1941 to the time of his death; a Member of the Wilson Ornithological Club, Nebraska Ornithologists' Union and National Audubon Society.

His death, which struck while he seemed so sound in body and excellent in spirits, was a blow to his family and wide circle of friends. Funeral services were held at St. Matthew's Episcopal Church and he was buried at Wyuka Cemetery, a beautiful spot in which for some forty years he had regularly observed the birds. An ornithological project in his memory, to be carried on within the State of Nebraska, will shortly be announced by the Nebraska Ornithologists' Union. In this way, at least, can Dr. Hilton's friends give expression to their admiration and affection for the great man who has gone from their midst.—George Miksch Sutton.

Eric Graham McDougall, an Associate of the American Ornithologists' Union since 1933, passed away in London, Ontario, on December 29, 1944. He has been part-time librarian of the Royal Ontario Museum of Zoology, in Toronto, since 1934. Mr. McDougall was born at Toronto, October 31, 1887, the son of Judge Joseph E. McDougall, of York County Court, and the gransdon of Hon. William McDougall, one of the Fathers of Confederation. He attended Ridley College, St. Catharines, Ontario, and graduated from the University of Toronto in Forestry in 1911. He was associated for a short time with the Dominion Forestry Service, at Ottawa, and with the Forestry Service of British Columbia in Victoria.

Mr. McDougall served in the First Great War as a private with the Princess Patricia's Canadian Light Infantry. He reached France in August, 1915, and suffered the loss of his left leg at Hooge, Belgium, in April, 1916. From 1917 to 1934 he was climatologist of the Meteorological Service of Canada, in Toronto. His appointment at the Royal Ontario Museum of Zoology, in 1934, resulted from his desire to do something useful in natural history when ill health no longer permitted him to do full-time work.

'Phenological Observations' (1922), 'The Faunal Areas of Canada' (with the late Professor A. B. Klugh, 1924), 'The Moisture Belts of North America' (1925), 'The Range of the Caribou in Ontario' (1935) and 'Moose in Ontario' (1935) were his chief

published papers. At the time of his death he was on a committee preparing a history of the Amputations' Club, in which he took an active interest.

His widow survives him, and interment was in Mount Pleasant Cemetery, Toronto. —J. L. Baillie, Jr.

James Schenk, Corresponding Member of the American Ornithologists' Union, was one of the pioneers in bird banding and through his faithful efforts for nearly forty years made important contributions to this technique. Dr. Andrew Keve (Andreas Kleiner) has sent me information in regard to his life and achievements. Born in Overbósz in southern Hungary in 1876, Dr. Schenk attended the University in Klosesnór and in 1908, because of his ability as a mathematician, was asked by Otto Hermann to work up the results in bird migration in the Ornithological Institute in Budapest. At this time he started ringing birds, the third ornithologist to do so on a regular scale; Mortensen in Denmark had begun in 1899, Thienemann in Germany in 1903. His special interest lay in the study of migration, in the return of adults to their nesting areas and young to birthplace, in ages attained and mortality of young and old, as well as in the history of falconry and in bibliography. He edited the journal 'Aquila' in which a large section was always devoted to the reports on banding; he wrote the ornithological part of 'Fauna-Catalogus of Hungary' (1918) and the new Hungarian 'Brehm' (1929). In 1935 he became director of the Ornithological Institute and held this post until his death, February 22, 1945, of heart disease. Always active in bird protection, in 1938 he had been elected vice-chairman of the Bird Preservation Committee for Europe at the Ninth International Ornithological Congress at Rouen. It was here that I met him. He urged me to visit Hungary, arranged for my trip to Lake Velence, and spent a day showing me the birds. He was a charming and genial man, with great industry and great knowledge.—Margaret M. Nice, *5725 Harper Ave., Chicago, Illinois.*

Professor Herbert Eugene Walter, an Associate of the A. O. U. since 1901, died at his home in Providence, Rhode Island, on October 1, 1945, in his seventy-ninth year. He was born in Burke, Vermont, on April 19, 1867, spent his schoolboy years in the neighboring village of Lyndon Center, and married Alice E. Hall of Lyndon in 1896. Mrs. Walter, who is an ardent bird student, and who, until recently, has long been active in Audubon and conservation circles, survives him.

Walter's renown as a zoologist has largely obscured his interest in birds. It was during slow convalescence from severe boyhood illnesses that he began to observe nature and bird life. In college this interest was encouraged by Jonathan Y. Stanton, a classics professor who was also an enthusiastic ornithologist, until it proved the gateway to a scientific career. Although Walter later specialized in the comparative anatomy of the vertebrates and in genetics, birds never lost their charm for him and he was ever active in encouraging others to find in bird study the same pleasures he had found.

Walter was graduated from Bates College in 1892. He did a year of graduate study at Brown University in 1892–1893, spent the following year studying in Germany, and then devoted ten years to secondary-school teaching before going to Harvard for two years, getting the degree of Ph.D. there in 1906. Following this, he joined the faculty of Brown University and remained there until his retirement in 1937 after having been full professor of biology for fifteen of his thirty-one years at Brown.

His first publication was a section on 'The Birds of Androscoggin County, Maine,' which he contributed to the 'History of Androscoggin County, Maine' (1891), while at Bates College. His paper on 'Bird Study in City Schools,' which was printed in

'School Science' (1900), is still a helpful and hopeful discussion of the subject. This problem of arousing interest in living things among city children led him to develop ingenious methods of making use of museums and other available aids. While teaching biology at the North Division High School in Chicago, he pioneered in combining voluntary field work with his courses by inviting his students to observe the spring migration of birds in near-by Lincoln Park. This project was unique in differing radically from the usual "bird walk": he would explain the rules of field identification and then ask his pupils to submit personally observed details of certain minimal characteristics; and though he himself was in the park each morning to appraise the status of things, he did not point out anything. Thus, those students who wished to add to the master list of birds identified each season were forced to observe accurately in order to satisfy his keen but friendly grilling. This list was a prominent feature of the biology room and it created great enthusiasm. A secondary result of this field activity was 'Wild Birds in City Parks' published jointly with Mrs. Walter in 1901 and revised and enlarged several times until 1926.

While at Brown, Dr. Walter conducted university courses in ornithology from 1906 to 1916 and also gave extension courses in bird-study for teachers and other adult groups, as well as many free public lectures. Of these, 'Theories of Bird Migration' (16 pp), published in 'School Science and Mathematics' in 1908, shows his ability to evaluate, condense, and present clearly in historical sequence data from many sources. He made fact based on experiment stand out from fancy, foreseeing the need of a great increase in the store of facts as to *how individual birds migrate* before the answer to *why* they migrate could be found. But only those who saw and heard him reveal, with quick blackboard sketches and apt comparisons, the secrets of comparative anatomy and evolution as he described, for example, the bird's skeleton, can fully appreciate the illuminating charm of his teaching. Many have written him in later years to say that the enthusiasm for bird life he had aroused in them had remained one of their most treasured possessions.

Concurrently with his work at Brown, from 1906 to 1927 he conducted a summer class in field zoology at Cold Spring Harbor Biological Laboratory, in which birds were always given due consideration as members of the biotic community. Until 1918, Mrs. Walter had a class studying the birds at Cold Spring Harbor, to which he contributed in the field and the lecture-room, adding many notes to her 'Study of the Birds of a Limited Area,' which we hope may yet appear in print.

Dr. Walter's best known writings are his 'Genetics,' a standard text with a large foreign circulation that was translated into Japanese as well as revised several times from its original publication in 1913 until 1938; and his 'Biology of the Vetebrates,' that also ran through several editions from 1928 to 1939.

Besides being an Associate of the American Ornithologists' Union, and serving as President and later as Director of the Audubon Society of Rhode Island, Dr. Walter was a Fellow of the American Association for the Advancement of Science, a member of the American Society of Naturalists, the American Society of Zoologists, the American Genetics Association, the Eugenics Research Association, the American Museum of Natural History, Phi Beta Kappa, Sigma Xi, and the Board of Directors of the Long Island Biological Association. He was made a Doctor of Science by Middlebury College in 1934, and by Bates College in 1939.

Professor Walter had not a whit of pretension about him; his was the knack of encouraging enthusiasm by a genial and flatteringly generous interest in those who had the good fortune to know him. The notices of his death that have appeared in several other scientific journals will repay reading for those who would appreciate his scholarly and generous nature.—ROLAND C. CLEMENT, *Fall River, Massachusetts.*

NOTES AND NEWS

A DINNER celebrating the 80th birthday of Arthur Cleveland Bent was held at the University Club in Boston under the auspices of the Nuttall Ornithological Club on November 25, 1946. About 110 ornithologists and friends of Mr. Bent were present. Hoyes Lloyd of Toronto acted as toastmaster and brief addresses were made by the guest of honor, by Alexander Wetmore, Secretary of the Smithsonian Institution, and by W. Elmer Ekblaw of Clark University. Among those attending from more distant points were H. C. Oberholser and H. W. Brandt of Cleveland, Ohio; F. C. Lincoln of Washington, D. C.; James P. Chapin, Roger T. Peterson, John H. Baker and Carl W. Buchheister of New York; B. S. Bowdish of Demarest, N. J., and Alfred O. Gross of Brunswick, Maine. Mr. Bent was presented with a scroll signed by all those present.

THE American Ornithologists' Union has suffered the loss of two Members in recent months. Major Edward A. Goldman died in Washington, D. C., on September 2, 1946, and Ernest Thompson Seton, in Santa Fe, New Mexico, on October 23.

THE SIXTY-FIFTH ANNUAL A. O. U. MEETING

The American Ornithologists' Union will hold its annual meeting this year in Toronto, Ontario. The date of the meeting, determined by available hotel accommodation, is from October 20 to 24. Business meetings will be held on Monday the 20th at the Royal York Hotel. Registration and public sessions, consisting of the reading of papers, will commence on the 21st and continue through the 23rd at the Royal Ontario Museum. Friday the 24th will be a field day. Other social events will be arranged.

The Royal Ontario Museum, the Ontario Department of Lands and Forests, and a number of other institutions and clubs in Toronto are sponsoring the meeting. This will be the second meeting of the Union in Toronto and the fourth for Canada. The Royal York Hotel has been designated as the official headquarters. Make your reservations early.

The Local Committee on arrangements consists of J. L. Baillie, Jr., C. H. D. Clarke, O. E. Devitt, F. H. Emery, W. W. H. Gunn, F. H. Kortright (Treasurer), R. J. Rutter (Secretary), R. M. Saunders, T. M. Shortt, and L. L. Snyder (Chairman).

Address communications to any committee officer, c/o Royal Ontario Museum, 100 Queen's Park, Toronto, Ont.

A Summer Meeting of the British Ornithologists' Union in conjunction with the Scottish Ornithologists' Club has been arranged to take place in Edinburgh from June 20 to June 23, 1947. Members of the A. O. U. are cordially invited to attend. An extended motor-bus tour of the Scottish Highlands has been arranged for overseas visitors, from June 24 to June 28. The cost of this tour, including transport, hotel accommodations and meals, will be approximately £10. Sleepers from London to Edinburgh and hotel accommodations in Edinburgh are being arranged but are limited. Those persons intending to attend the meeting should communicate at once with Miss Barclay-Smith, Secretary B. O. U., British Museum (Natural History), Cromwell Road, London S.W. 7, from whom further details may be secured.

THE AMERICAN ORNITHOLOGISTS' UNION AT A GLANCE

ORGANIZED—in New York City, Sept. 16, 1883: Incorporated—in Washington, D. C., Nov. 15, 1888.

OBJECTS: "The advancement of its members in Ornithological Science; the publication of a journal of Ornithology and other works relating to that science; the acquisition of a library; and the care and collection of materials relating to the above objects, under the restrictions and regulations established in its By-Laws."

OFFICERS: President, two Vice-Presidents, Secretary, Treasurer, and 9 elected Councilors. Two Councilors appointed by Cooper Club and Wilson Club. Officers, the Editor and ex-Presidents are ex-officio members of the Council.

MEMBERS: Associates (unlimited), Members (150), Corresponding Fellows (75), Honorary Fellows (20), Fellows (50), Fellows Emeriti, Patrons. (Total membership in 1946 about 1949.)

DUES: Annual—Associates $3, Members $4, Fellows $5.
Life-Members of any class $100; Patrons $1000.

INCOME: From annual dues, sale of publications, life memberships, and contributions.

MEETINGS: Annual—usually in October or November.

PUBLICATIONS: 'The Auk,' a quarterly journal in 62 volumes, with 5 general indexes: 1876–1900, 1901–1910, 1911–1920, 1921–1930, 1931–1940. 'Check-List of North American Birds': 1st ed., 1886; 2d ed., 1895; 3d ed., 1910; 4th ed., 1931. 'Code of Nomenclature,' 1886; Revised ed., 1908. (See Auk, '24, 142.)

BREWSTER MEDAL: The income from a fund of $7250, established in 1919 by the friends of William Brewster, awarded biennially (now annually) to the author of the most important work relating to the birds of the Western Hemisphere published during the preceding six years. Awarded in 1921 to Robert Ridgway, in 1923 to A. C. Bent, in 1925 to Todd and Carriker, in 1927 to John C. Phillips, in 1929 to C. E. Hellmayr, in 1931 to Mrs. Florence M. Bailey, in 1933 to F. M. Chapman, in 1935 to H. L. Stoddard, in 1937 to R. C. Murphy, in 1938 to Thomas S. Roberts, in 1939 to Witmer Stone (posthumously), in 1940 to James L. Peters, in 1941 jointly to Donald R. Dickey and A. J. van Rossem, in 1942 to Margaret M. Nice, in 1943 to Alden H. Miller, in 1944 to Roger Tory Peterson, in 1945 to H. Albert Hochbaum.

WHERE TO FIND FURTHER INFORMATION

ADDRESSES OF OFFICERS AND MEMBERS—Annual list usually in April Auk. Copies of last list (1946) available at 50 cents each.

THE AUK (LOCATION OF SETS)—Auk, '19, 634; '20, 348; '24, 207; '29, 584.

THE AUK IN PUBLIC LIBRARIES—Auk, '30, 609.

BIOGRAPHIES OF DECEASED MEMBERS—Auk, '35, lviii and current issues.

BREWSTER MEDAL—Auk, '20, 29; '22, 86; '24, 125; '25, 484; '26, 69; '28, 71; '30, 219; '32, 52; '34, 53; '36, 57; '38, 317; '39, 113; '40, 142.

BY-LAWS: Auk, '27, xi; Auk, '38, 330–340.

DATES OF PUBLICATION OF THE AUK (1912–1943) follow the Index in each volume or the title pages in later volumes.

HISTORY OF THE UNION: Allen, J. A., 'A Seven Years' Retrospect,' 1891; "The A. O. U.,' Bird-Lore, 1899, 143.
Palmer, T. S., 'The A. O. U.,' Am. Mus. Journal, '18, 473; 'Looking Backward,' Auk, '24, 139; Fifty years' progress of American Ornithology, 1933, 7–27.

MEETINGS: Auk, '24, 143; '30–'36, back cover of October numbers.

MEMBERSHIP:—Auk, '24, 140; Fellows, '18, 110; Foreign Members, '18, 266; Members, '18, 384; Associates, '18, 513.

PERMANENT FUNDS: Auk, '20, 513. (See yearly Treasurer's and Trustees' reports.)

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A Quarterly Journal of Ornithology

ORGAN OF THE AMERICAN ORNITHOLOGISTS' UNION

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All articles and communications intended for publication and all books and publications intended for review should be sent to the Editor.

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American Museum of Natural History
79th Street and Central Park West
New York 24, N. Y.

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